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COMPUTER WEEKLY

After the silicon machines . . .

ALTHOUGH the next top-end machine from Univac will still use Emitter Coupled Logic (ECL) technology, and be between four and six times as fast as the Univac 1100/80, the next system could feature semiconductor circuitry based on Gallium Arsenide (GaAs). That is how Barry Borgerson (right), director of research and technical planning for Univac at Blue Bell, Pennsylvania, sees it. He told Computer Weekly that the next ECL-based machine would appear in three to four years, and that it would probably be another four years before the GaAs versions were ready for delivery.

Commenting on the advantages of GaAs, he said, "It has up to six times the electron mobility of silicon, and can therefore operate up to six times faster. Also, we have found that by cooling GaAs circuits with liquid nitrogen we can get even further speed improvements — up to four-fold increases compared to normal operating temperatures." And since GaAs semiconductors feature an insulating substrate, another feature is low power consumption.

The use of cryogenically cooled Josephson Junctions is also being looked at by Univac, specifically those manufactured from niobium or lead. These are "maybe a decade or more" away in development.

BORGERSON . . . "Six times faster than silicon . . ."

NEWS IN BRIEF

Mini 'lost' in PO pay dispute

WITH the telephone billing backlog approaching £300 million this week, neither side in the Post Office pay dispute (CW, May 10) has given way, and with systems such as Laces at Heathrow still out of operation, the Customs cargo warehouses are overflowing with uncollected imported goods.

Included in these is a minicomputer of US origin which was to be used for Prestel billing. It has been temporarily "lost" along with some of its disc drives.

Times stalemate

THE compromise offer by The Times management over direct input by journalists (CW, May 10) has been rejected by the National Graphical Association. The NGA has agreed, however, to meet again with management this week, in conjunction with the journalists' union.

Better printout

IMPROVED quality over conventional computer printout is one of the main reasons given by the Computer Management Group for deciding to install an 8,000 lpm Honeywell Page Printing System worth £125,000 at its Croydon headquarters.

Control system

BUILDING on its Videospec and Spec 200 range of industrial and process control equipment, Foxboro has added a micro-based control module called Microspec and a new communications network called Foxnet to produce an integrated industrial control system called Spectrum.

Norsk adds two models to mini line

NORWAY'S enterprising minicomputer manufacturer, Norsk Data, has added two formidable new models to its Nord line of minicomputers. Called the Nord-500 and the Nord-100, they will be available in the UK through Richard Norton (Nord) of London.

As with the earlier Nord-50 and Nord-10/S, the 500 is a 32-bit machine and the 100 is 16-bit, and a 100 is required as front-end to a 500, with both machines sharing the main memory.

The Nord-500 offers an enormous eight Megawords, 32 Megabytes of main memory capacity and is three times as powerful as the Nord-50. The maximum main memory is double that available on the largest IBM machine, the 3033.

It is rated at five million instructions per second, and has a minimum 32K-byte cache, extendable to 64K-bytes. The cache is allocated half to data and half to instructions, and can be sub-allocated to different applications in a multiprogramming environment.

It includes hardwired floating point arithmetic operating on 32 and 64 bits, and maximum disc capacity is 4.3 Gigabytes of data and 4.3 Gigabytes of instructions.

The Nord-100 uses the AMD 2900 bit-slice family, and also supports a maximum 32K-bytes. It is built around a 1.8 Megaword per second bus, and without cache matches the performance of the Nord-10/S with cache. Adding a 2K-byte cache and fast memory management improves performance to between 1.2 and 1.9 times that of the 10/S.

Both machines run under the standard Sintran III VS operating system, which together with the Fortran 77 compiler is included in the hardware price. IBM compatible RPG II, Ansi 74 Cobol, Basic, Pascal, Coral 66 and Simula compilers are all charged, as is the Sibas database system.

Minimum Nord-500-100 configuration with 258K-bytes of memory, 37 Megabytes on disc and a tape unit costs £120,000, and will be available early next year. The Nord-100 is available now.

Suspension threat angers GEC men

GEC development engineers, currently involved in a pay and grading structure dispute with the company (CW, May 10), have said that they will find higher-paid jobs elsewhere if the management goes through with its threat to suspend those still taking action after May 21.

A letter from the company to all 450 development engineers at GEC's two Coventry sites said the strike action by only 18 key people was "adversely affecting" System X work.

"This letter has incensed many of our members," said an ASTMS spokesman. "The company could lose the goodwill we have been showing during the strike. We have attempted to hit only short-term work, not long-term prospects."

Merger meeting

THE IDPM's micro and management conference is to be preceded by an extraordinary general meeting at the Bloomsbury Centre Hotel, WC1, on May 23 starting at 10 am. The main items on the agenda are resolutions covering the IDP-DPMA merger.

East Germany moves into market for OEM daisy wheel printers

THE poorly-served market for OEM daisy wheel printers will have a new contender next year, when Robotron of East Germany introduces its 1152 device. The Robotron printer uses a standard 96-character daisy wheel; and the product, planned to go into production this year runs at 30 cps; but faster models will become available.

Rather than investing heavily in durable materials for daisy wheels, Robotron is producing a simple, low-cost plastic wheel which it believes will have a life of three months in normal use.

Customers will get a supply of spare daisy wheels, which Robotron says are simple to change. The line width is 132 characters standard, expandable to 210, and an original and up to five copies can be printed, red and black printing is possible, and both printing and paper feed are bi-directional.

Daisy wheel printers are by far the most widely used devices for letter-quality output from word processors, but at present the OEM market is shared almost exclusively between two manufacturers, Qume and Diablo. The Nippon Electric Spinwriter is a variant, using a shuttlecock wheel, but is so far little used, and Wang builds its own but does not offer them OEM.

Matrix printers from Robotron are available in the UK through Sharp, and in France through Sanyo, and the local subsidiaries of these Japanese companies are likely to have first option on the Robotron 1152.

Pet prize offered to schools

SCHOOLS in South Yorkshire have a chance to win an 8K Commodore Pet home computer as the prize in a competition organised by Sheffield bureau GMS Computing. The contest will be open to schools even where programming is not taught yet, and is oriented round the task of designing an environment for the "Office of the Future".

For the elimination round, schools will be asked to submit designs for an office layout with a computer and terminals, for a work station, and for displays to appear on screens.

The final will take place at GMS headquarters, using terminals linked to their IBM 370. Four teams will be given exercises against the clock, again to do with the ergonomics of the electronic office, but involving no actual programming.

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CEGB first user of new software

TELECOMPUTING has won its first customer for native mode 2900 TPS in the form of the Central Electricity Generating Board. The CEGB's North-east region is expected to be the first user of the new software and is planning to go live early in 1980.

As a prior step, Telecomputing has contracted to demonstrate that the region's existing TPS applications under 1900 can be run under VME/B without change. This demonstration is scheduled for October.

Subsequently, two out of the other four CEGB regions are scheduled to convert to 2900 VME/B — the South-west and the Midlands. Both already have TPS-based applications running in 1900 mode.

Telecomputing has for some time been committed to developing native mode 2900 versions of TPS, to ensure the forward compatibility of TPS-based application systems. However it has until now assumed that a VME/K product would be the first required and last year ordered a 2950 specifically to develop the K version (Software File, June 20, 1978).

The CEGB contracts mean that a VME/B version will now almost certainly be the first to appear and represent a significant vote of confidence for Telecomputing in the wake of recent ICL TP announcements (CW, April 19).

Briefing

SDL to set up viewdata centre

INSAC members Systems Designers, has been picked to establish a systems division for the Insac International Viewdata Centre.

The centre is being set up in London to show potential customers the Post Office's Prestel system in action (CW, February 8).

The systems division will be at SDL's premises in Frimley, Surrey, equipped with a large GEC 4082 mini. It will provide support and development services for companies and organisations buying rights to the Prestel software and system throughout the world, including the US.

Borgerson leaves

AFTER just over two years with Univac at Blue Bell, Pennsylvania, as the company's director of research and technical planning, Barry Borgerson has left to join software and communications company Manufacturing Data Systems of Ann Arbor, Michigan.

World market

A KEY feature of the proposed acquisition by Sanders of plotter systems specialist Calcomp (CW, May 17), is that it will provide Sanders with a ready-made worldwide end-user marketing network for its graphic display systems

First samples

FIRST wafers of Motorola's new 16-bit microprocessor, the 68000, have passed through the production process at the company's plant in Austin, Texas, with a fair measure of success. A spokesman for the company said that only "one or two" problems needed to be sorted out in the second iteration of the design, and samples are now expected in August.

Fujitsu line

THE bottom end of the new F series of Fujitsu's M1X0 line, which covers models from the M130 to the M160, uses a CPU constructed of newly developed ...-gate Schottky technology master slice arrays. A master slice is an array of defined logic elements of various types which are connected together to form a variety of higher-level circuits at the final stage of fabrication.

Disposable mini

A "DISPOSABLE" 16-bit minicomputer is to be launched by Computer Automation that should be cheaper to throw away than repair. This is the idea behind Scout, which could see the light of day at the NCC in New York. A typical system would cost $1,000.

Bid for video firm

US electrical and electronic conglomerate, Bunker Ramo, best known in the computer industry for its video terminals, is considering a bid from Fairchild Industries which would involve Fairchild increasing its holding in Bunker Ramo.

Julia chairs BCS group for disabled

New chairperson of the BCS specialist group for the disabled is Julia Howlett, pictured here with her guide dog Beulah.

Julia, who is partially-sighted, at present works at the National Physical Laboratory, where she is project leader for Movia, a micro-based device providing a wide range of aids for the disabled (CW, October 12, 1978). She is leaving shortly to set up her own company, St Margaret's Software.

In her new role, Julia hopes to use her contacts in the world of research to stimulate applied research and development into aids for the disabled, with particular reference to microcomputers.

NEB 'chief sacrificial victim'—Varley

INDUSTRY Minister Sir Keith Joseph refused to spell out in the Commons any specific government plans for the National Enterprise Board or any of the projects it has sponsored or the companies in which it has an investment.

Making his first speech in his new post during the Queen's Speech debate Sir Keith said there was bound to be a transitional period and his department would be reviewing the assistance to industry generally. He added "A great deal of provision has already been allotted and the scope this year will be significantly less than the scope in my department in years to come."

When the House divided, the Labour amendment protesting at the plans to restrict the NEB and sell off parts of the nationalised industries, was rejected by a majority of 82.

The resumed debate had been opened by Eric Varley, Labour's Industry Secretary, who said Tory plans to carve up and sell off the profitable parts of the nationalised industries was an act of wanton industrial mayhem. He said the chief sacrificial victim was going to be the NEB.

Companies which had prospered for decades under public ownership would become the victims of cynical exercises of asset stripping of the worst kind the country had ever seen.

"Last Tuesday the Prime Minister proudly proclaimed that the government would require the NEB to dispose of certain holdings in profitable companies. Why are they profitable? Because the State stepped in to

● Turn to page 14

Next 4300 a field upgrade

IN a radical departure from its usual marketing policy, IBM's next E Series machine is to be offered as a field upgrade from the 4331. Expected to be known as the 4336, it will fall between the 4331 and the 4341, offering a powerful boost to users who have ordered the smaller system and want an on-the-job update. Launch of the new machine is set for next month and it could make its debut at the NCC in New York.

While both Aharon Orlansky, now with stockbrokers Dean Witter Reynolds, and Bob Fertig of Advanced Computing Techniques, agree on a June date for the 4336, there is less certainty about the next two models at the top of E range — a 4346 which would be an upgrade from the 4341, and a 4351.

Fertig believes that IBM would have liked to have added a 4346 this year, but that it may have been held up by manufacturing difficulties with the 4341, centring either on the cache memory or the processor itself.

Orlansky believes that whatever problems there were, have been solved, but anyway does not expect a 4346 model until the middle of next year.

Fertig's prediction on the 4336 is that it will offer about twice the power of the 4331, putting it around the 0.45 to 0.5 mips mark, which compares with 0.43 mips for the 370/148. With essential software he expects it to be priced at between $160,000 and $180,000, compared with around $100,000 for the 4331.

Meanwhile the first 4331 has been shipped to a US customer, as for unidentified.

At the other end of the scale, Orlansky still believes that the first models of the H series, to replace the 3030 series, will be announced in the middle of 1980, for deliveries in 1982. This means that the 3030 series will be around for considerably longer than IBM intended. The main reasons are that the quite unexpectedly high demand for the 3030 series machines caused deliveries to be strung out over a period of years, and the demand for all IBM's new products is straining the company's manufacturing resources.

"IBM is not prepared to make major investments in new manufacturing capacity to meet short-term demand," comments Orlansky. "I believe they may increase capacity next year, but

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Workshop on software certification

AS an exploratory step towards formulating UK and European policies on software certification, the NCC is to hold a two-day workshop in conjunction with the relevant French and German agencies, BNI and GMD.

The workshop, scheduled for September, will concentrate primarily on the validation of language implementations. Among topics to be discussed are methods of compiler testing; the requirements for testing; and relevant regulations already introduced in Europe and elsewhere.

ICL offers VME/B on 2956

MOST striking feature of the 2956/10, announced with the 2905 and 2950/10 at Hanover (CW, April 26) and now introduced to the UK market, is the availability of the large-scale VME/B operating system.

VME/B has hitherto been available only on large configurations of the 2960. The 2956 is now the only large 2900 which is not offered ... the smaller VME/K operating system.

ICL is also following the IBM route in packaging system software into easy-to-mount suites. IBM calls these Installation Productivity Options, IPOs, while ICL has opted for Productivity Enhancement Packages, PEPs.

ICL's version does not include the operating system, and the first PEP comprises subsets of IDMS and Data Dictionary System, together with the Minimac multi-access system and the Range Cobol system.

Other details are as announced at Hanover.

DataGen offers Pascal

EVIDENCE that Data General's Advanced Operating System is seen by the company as its future standard has been provided by the release of an AOS-subset, called Micron, for the 16-bit MicroNova.

Said to be designed for real time microcomputer applications, Micron is a multi-tasking operating system and comes with AOS-compatible Pascal and Fortran IV compilers. An Eclipse running AOS can therefore operate as a multi-user development system for the MicroNova.

Micron also supports program development on suitably configured MicroNova systems with 64K bytes of memory and a disc or diskette subsystem. Among facilities provided are an interactive debugger, an AOS-subset command line interpreter, a text editor, and a file management system.

An important feature of Micron is modular internal design, allowing the user to select only those routines needed for a particular environment.

Universities share

INTERACTIVE and batch operations at the University of Lancaster will be available on an ICL 2960, which replaces an ICL 1905F scientific machine. The new system will also become part of the North-West Universities Network, made up of five ICL 1900 and three CDC 7800 machines. The NWUN allows the universities of Keele, Lancaster, Liverpool, Salford, and the University of Manchester Regional Computer Centre to share resources using packet

INSIDE THIS WEEK'S CW.....

SITTING COMFORTABLY?

The quality of the working environment often leaves a lot to be desired. Using the ergonomic approach, designers are aiming to deal with some of the problems that arise. Malcolm Ballantine reviews the scene. Page 4

STANDARD SEARCH

The search for telecommunications standards goes on in London next month when the ISO TC97/SC16 meets. One of the main topics to be considered will be protocols for open system interconnections and Frank Taylor looks at some of the points that have to be resolved. Page 14

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Must we all join the paper chase?

AGONISING over shortage of staff continues to be one of the favourite pastimes in our industry, and the sense of unreality one feels on comparing this shortage to the 1½ million on the unemployment rolls in the outside world remains unabated. It is appropriate therefore to ask whether the industry has not in part brought this affliction on itself, by asking for too-high qualifications from entrants.

Getting a start in computing has always been the fundamental problem facing those outside who wish to help themselves and the economy as well by switching to careers in the technology of the future. So it is indeed welcome to see in the London evening papers advertisements from large established companies offering trainee positions to people with no experience at all in computing.

But what qualifications are sought in these advertisements? One, for trainee computer operators, demands "at least 5 'O' levels including maths". Another, for trainee programmers, says "Candidates should preferably be educated to degree level."

A moment's thought leads one to recall that five "O" levels are the qualifications required to start a career as an Army officer, which is worlds away from computer operating.

Certainly operating is a non-trivial job; it requires plenty of native intelligence and a methodical attitude of mind, but it is not an academic pursuit, and it makes no sense to tie it to the university side of the curriculum.

Similarly, programming has long been notable for the fact that it has been done, particularly on the business and commercial side, by people without degrees. Just as it is often emphasised that understanding of mathematics is not necessary for programming, so one can be a perfectly able programmer without having followed a rigorous academic course to the age of 21.

George Penney, the NCC's education and training man, has often pointed out that DP firms are excluding large numbers of people perfectly capable of doing the jobs in question by insisting on degrees.

The move towards asking for higher and higher scholastic qualifications is, of course, not confined to the computer industry. It was noted some time ago in an American firm that, whereas formerly lift operators were required to have completed primary school, now they must have finished secondary school and received a diploma. There has been no noticeable improvement in the lift service as a result.

The reason why many organisations make these demands is not because they feel the qualifications are essential to the work but simply as a primary filter to reduce the number of applicants that have to be considered in detail. Indeed, if they can get enough applicants with these qualifications they may feel there is no reason why they should not carry on asking for them. However there are harmful side-effects on our educational process and our whole society which these firms really ought to take into account, before they use degrees and such simply as a cop-out to make life easier for their personnel departments.

In the ever-worsening educational rat-race, more and more young people are being forced to pursue academic courses to which they are not really suited, simply in order to keep their place on the ladder. There are a large number of practically-oriented people who are capable of achieving a great deal in life but who find it much easier to learn on the job than in the cloistered atmosphere of a classroom. It would be a great pity if, in the trend towards paper qualifications, all opportunities for these people were to disappear.

The social problems presented by the large numbers of unemployed black youths in London are all too obvious, but there is no doubt that there is plenty of potential among those people. The educational system has failed them, but there is no reason why industry should as well.

The practical nature of computing and its tradition of learning on the job have led to its being described as "a career for people who otherwise would have to be content with a job". This has been a social contribution of major significance that the computer has made, and while the highly abstruse sides of computing are certainly on the increase, it would be a great pity if all opportunities for non-academic people in the field were to dry up.

The issue of professionalism comes into this, of course. Those concerned to raise the social status of computing, as in other professions such as teaching, see paper qualifications as one way of achieving their ends.

They must remember, though, that seeking after status, unlike seeking after money, is of no benefit to the rest of society, since status is by definition only relative.

We hope that computing can continue to serve our people as a dynamic and highly flexible vocation.

Ten years ago...

COMPUTER WEEKLY MAY 22, 1969

FIRST steps in the design of "macro-economic database" were in hand, Mrs Judith Hart, Minister responsible for the Civil Service, told the Commons ... ICL was to set up a [illegible] Australian subsidiary to produce software for export worldwide ... Unilever Computer Services was set up to control Unilever UK computing ... At a time when Stanford University in the US had three IBM 360s, Oxford University requested an ICL 1906A to replace its KDF9 ... The first Oxford Shakespeare Concordances, produced on the KDF9, were published by the OUP ... A forecast that 90% of American computer [illegible] would be making use of terminals by 1972 was made by Diebold ... British Aircraft Corp was tending to move away from ICL in favour of IBM equipment.

NEB holding in Case

DETAILS of the National Enterprise Board's holding in data communications equipment makers Case, as quoted in NEB accounts (CW, May [illegible]) did not give an accurate picture of the board's overall share of Case.

Case's 500,000 preference shares carry voting rights, four preference shares being equal to five of Case's 700,000 ordinary shares. NEB holds only 3% of Case preference shares so that its overall holding in Case based on voting rights works out at only [illegible] and not 49.9%.

Keeping options open

FOR DP management, keeping options open is essential. This attitude has never been more necessary than at present. New technology is not so much striding but leaping into the computing world. Yesterday's technology is being consigned to the DP dump almost before today's new quota is announced.

With today's mini/micro processors packing more force than many existing mainframes, hardware commitments have to be highly flexible. Likewise consigning impressive resources to that new in-house budget application could well result in a gross mis-spending of funds, in view of the many software packages becoming available.

In the past, DP management has been prepared to commit itself and its installation well into the foreseeable future. Mainframes were purchased or acquired on five-year leases. Projects were planned on equally lengthy timescales. The foreseeable future, however, has been subjected to a severe dose of time-warping, with the month after next a reasonable period for accurate forecasting.

Far from keeping policy doors shut and bolted, it is advisable to leave sufficient room for manoeuvre. Keeping the best of all possible options suggests ordering the new configuration from the more enlightened manufacturer who, along with the hardware, guarantees the acceptance of PCM suppliers, independent field engineering and non-restrictive operating practices.

Much of the daily tribulations of installation management can be cured by a healthy dose of independence.

Along with open options, close relationships with alternative suppliers are prudent. Back-up in case the stationery supplier has gone out of business or the cleaning staff absconded should be readily available.

Management could well be the art of compromise. It should also include a high element of contingency planning.

The DPM should always have a databank of service contacts to hand. Should half the ops team be struck down with some dreaded lurgy, then reinforcements can be brought in. Likewise having friendly relations with the local bureau will assist with that sudden, unexpected workload.

Outside the confines of the installation, options are not so open. Booking for that Structured Walk-Through Course is not conditional on whether the in-house situation is trouble-free. Bookings do not as a rule feature a walk-out overriding clause.

But even the NCC, the defender of installation standards and structured planning, has got the flexibility message. In its recent publication, Computerisation Guidelines, management is advised that it has three options: A decision to proceed; a decision not to proceed; and postponement of the decision.

Only rarely however is the third option the most feasible course. But providing the decision is kept flexible, with built-in escape clauses at all levels, the DPM can ensure a smooth ride.

Unfortunately it is rare for options to include that of DPM transferability to a less formidable role in the organisation.

1984 and all that...

FIRST of several readers who sent in this example of the strange things said in media about computers was J. C. Smeathers, of Cheadle, who wins £5.

Inmos's product, the 64K Ram, is a single silicon chip capable of storing 64,000 pieces of information ... Such a powerful memory would have cost hundreds of pounds, and have been called a computer, only a few years ago.

Patrick Sergeant in the Daily Mail

MINISTRY OF DEFENCE
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Science 3, in Holborn WC2 have a requirement for a minicomputer system to allow data acquisition and analysis, conventional programming (FORTRAN and BASIC) and use as a research tool.

Proposals are required by 29 June, 1979.

Applications for operational requirements quoting CEH/34 to:
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Texas Instruments Range of Printers — Texas Instruments — From £1295
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Staff must have say in use of micros

THE need for workers to participate in controlling the introduction of micros into their organisations is emphasised in a report prepared by the Post Office Engineering Union. Entitled The Modernisation of Telecommunications, it gives a guarded welcome to micro technology for its potential overall benefits, but warns that in spite of reassurances from various sources, unemployment could rise rapidly. What remains could be de-skilled, bringing loss of control for workers over their own work, affecting the pace of work and bringing stress and other health risks.

The report criticises the Post Office manpower forecast, the "Yellow Book," for being based on a single set of debatable assumptions which are not made explicit, and have not been discussed with the union.

It suggests that Post Office estimates for future demand for telephones are too conservative, and that manning reductions for new exchanges are excessive.

The report calls on the Post Office to give urgent priority to creating its own electronic office to act as a showcase, and for a more aggressive approach to the development and marketing of new services.

The UK must develop an all-electronic digital network faster than other advanced nations because this is needed as a base for new services.

The union thinks that too few Post Office senior managers are alive to current and future developments in electronic mail, and welcomes the licensing of Tortext in Stockport, Cheshire, to offer word processing and electronic mail services to the public.

A second report on new technology is published by Counter Information Services, a group of journalists which exists to publish its investigations of major social and economic institutions. This also calls for control being exercised over the introduction of new technology by the people who will be affected, or on their behalf and in their interests.

Commenting on the CIS report on Radio 4's Today programme, former Industry Minister Eric Varley said there was a role for government here with the NEB developing new services and NEDO representing government, the unions and employers to present an impartial view of the introduction of microelectronics.

China Syndrome for H-series?

ANYONE who has read about the accident at the Three Mile Island nuclear power plant near Harrisburg, Pennsylvania, will probably have heard also of The China Syndrome, a new American film about a nuclear reactor overheating.

Following suggestions that top models in IBM's forthcoming H-series may be cooled by Freon, the inert gas widely used in refrigeration, US doomwatchers are predicting a possible China Syndrome in the computer room.

The top machine in the H series is expected to be extremely powerful, and to offer up to 40 Megabytes of main memory (CW, May 10). Use of Freon cooling would avoid the need for plumbing used on the 370/168 and 3033, and would also prepare users for the inevitable cryogenics which will be required for future machines using Josephson Junction technology.

But what, ask the doomwatchers, happens if in early installations, the new technology cooling system fails? Does that enormously expensive box of hardware simply melt, or will the results be more catastrophic?

NCR's integrated cassette recorders

INTEGRATED cassette recorders are now available on the NCR 2140-2000 and 2140-7000 point-of-sale terminals, so allowing data to be captured at the point of sale for later processing on a central or bureau computer. Prices of these two 2140 models start at £2,495

Nuclear submarine propulsion systems are to be simulated in real time at the Royal Naval College at Greenwich by an EAI Hyshare 600 hybrid computer supplied by Electronic Associates under a contract worth about £550,000.

The Hyshare system (pictured above), which will be used for training nuclear submarine engineers, combines an EAI 3200 digital processor with an EA681 analogue computer. Analogue to digital conversion and back will be handled by the EAI 3287 interface which has 32 channels and can handle up to 450,000 conversions per second. Functions with up to four variables pre-programmed by the 3200 will be generated by an EAI MVFG function generator.

Schlumberger takes over Fairchild

IN a surprise move, electronics and industrial multinational Schlumberger has made a successful $66 per share offer for Fairchild Camera and Instrument.

The Fairchild board has recommended this offer to its shareholders despite the fact that Gould, the US electrical group, which has been trying to buy Fairchild for some weeks (CW, May 17), had boosted its bid from $57 to $70 a share.

An agreement between Fairchild and Schlumberger was announced this week, following unanimous approval of the Fairchild board.

Fairchild will continue to operate as a separate subsidiary under the agreement.

Gould's revised offer, for up to 2.25 million Fairchild shares at $70 each, was rejected by the Fairchild board, the third time it has turned down Gould.

Gould planned to merge Fairchild with either itself or one of its subsidiaries.

Following the Schlumberger offer and its acceptance by Fairchild, Gould has now withdrawn from the battle.

ITT restructures in UK

IN readiness for a plan to sell shares in its UK operation, ITT has reorganised its British companies in two groups under a new holding company, ITT (UK).

Shares are to be offered in only one of the subsidiaries, Standard Telephones and Cables, which will now include ITT Business Systems, ITT Components, ITT Distributors and Standard Telecommunication Laboratories. The other subsidiary, ITT Industries, will take in semiconductors and all other manufacturing and service activities in the UK.

About 20% of STC's shares are to be made available to the public and they are expected to be on the market next month. The sale is in line with ITT's policy of seeking public interest in telecommunication subsidiaries. A similar exercise was carried out in Germany 18 months ago.

It has been suggested that ITT might use the funds raised by the sale to bid for Plessey's public telecommunications operation, and according to investment analyst Mike Whitaker, of stockbrokers Simon and Coates, the City would favour this.

Even a Conservative government would be keen to see a restructuring of the telecommunications industry, he said.

A spokesman for ITT said that when Plessey had offered itself to ITT last year, ITT had not been interested and there was no reason for that position to have changed.

Unions in Times talks

LOCAL officials from the National Graphical Association and the National Union of Journalists are meeting jointly to try to devise a mutually acceptable scheme whereby the Times' new computerised typesetting equipment could be operated.

If a plan is agreed, it will be presented to management. Regarding the chances that management would find such a plan acceptable, NUJ Father of the Chapel Jake Ecclestone told Computer Weekly: "I think we can convince them."

Ecclestone asserted his support for the NGA's opposition of journalists using keyboards, "I don't think a journalist is a printer," he said.

Olivetti writ

OLIVETTI has served a writ claiming non-payment of debt on a firm that installed an Audit 5 accounting computer about a year ago and still refuses to complete payment on it. The firm is Reynolds and Co, accountants, of Hatfield, Herts, which intended to run a small bureau service on the A5 for 12 of its clients. Reynolds says that it asked Olivetti to take the machine back earlier this year after Olivetti had quoted £1,400 for developing additional software to handle various stock, debtor and creditor analyses.

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Dearieme

by Chad

Bishop's move used all the best bits

A READER in Chislehurst has turned up an interesting example of the use of a binary character code long before the Information Age. He refers to the Shutter Telegraph, which was used during the Napoleonic Wars to communicate between London and Dover, before the introduction of the better-known semaphore telegraph. The system, which was invented by, of all people, the Bishop of St David's, enabled messages to reach the coast from London in only seven minutes.

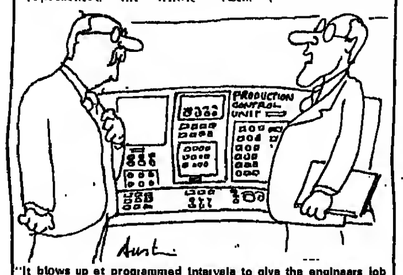
Webb's "History of Chislehurst", published in 1899, describes the building in the town that served as one of the telegraph stations. On its roof was a frame from which hung six swinging shutters. When these were held up, end-on to the observer, they would be invisible, and represented binary 0. Let down and visible, they indicated 1. Thus there was a 64-character code which represented the whole alphabet and a range of commonly-used phrases.

At each of the chain of repeater stations from London to Dover, a chap would squint through a telescope at the neighbouring station and set his shutters to match.

The system was used from 1798 until 1818, when the less cumbersome semaphore telegraph came along, with its swivelling arms like Navy signallers' flags.

I have no hard-rate figures for the Shutter Telegraph's data transmission speed, but I can't imagine they were very high. It is also difficult to conceive of a system that is less secure. What do you do when you catch a suspected telegraph tapper and he claims that all he was doing was watching Great Crested Grebes?

Just think — if the semaphore hadn't come along we might now be using Episcopal code instead of Ascii.



"It blows up at programmed intervals to give the engineers job satisfaction..."

Random accessory?

I HAVE received the following announcement from a well-known maker of calculators:

Hewlett-Packard are offering a free accessory worth £10.35 with any of their series E calculators bought between now and June 30. The offer can be redeemed only through HP authorised dealers.

It goes on to list the models in the series E, and extol their virtues. But does it say what this accessory is? No, it doesn't. I'm agog with curiosity! Whatever do you suppose it could be? A crocodile-skin carrying case? A diamante program card holder? A chinoiserie instruction book stand?

Suggestions on a postcard, please (to Hewlett-Packard, not to me).

Making working life more comfortable for the individual

IN the last few years, ergonomics has been taken into account in the design of work places, more than ever before. From the ergonomist's point of view, this is encouraging, yet in some ways it represents a transition from ignorance of ergonomic principles to misunderstanding.

In the design of some installations the ergonomic approach has been adopted wholeheartedly, but in other cases little more than lip-service has been paid. Often it seems the word "ergonomic" has been applied as no more than the latest advertising catchphrase. Unfortunately for the ergonomist, the next stage of development will not be easy.

The problem lies in the fact that people are not machines and an "ergonomic" design process that does not take this into account can produce results which may be even worse than ignoring human factors altogether.

To put it another way: people are complex and a simple set of recommendations is unlikely to be adequate. At the same time a relatively simple method can readily improve the quality of design.

How does all this relate to the design of working environments for data processing personnel? Let's first look at the aims of ergonomics.

Ergonomics is a problem-solving method which aims to improve the quality of working life by better design of machines and working environments. It relies heavily on the "human sciences", and psychology, physiology and applied anatomy in particular.

As far as environments are concerned, it looks at problems of heating and ventilation, lighting, noise levels, vibration and provision of adequate space. And most important: the measurement of effectiveness of design is by assessing how different arrangements affect the way in which work tasks are carried out.

This is at the source of the trouble — what is appropriate for one kind of task may not be in another situation, for example lighting. Whenever VDUs are used, this is probably the most important factor of all. Not that there's anything mysterious about VDUs. But they do present a set of exacting visual demands which are quite unusual. Source documents, or indeed any paperwork, will require plenty of light for ease of reading.

The mechanism, of course, is one in which light is reflected from the page — and in which white paper reflects more than black ink. A VDU screen on the other hand is luminous and independent of external light sources — and for optimal legibility needs a relatively low room brightness. This may seem obvious, yet on adequate compromise is quite difficult.

By Michael Ballantine

THE ergonomic approach aims to improve the quality of working life by better design of machines and working environments. Malcolm Ballantine, lecturer in the Department of Occupational Psychology at Birkbeck College, University of London, considers some problems facing designers.

What's more, if high levels of concentration are necessary it's important to keep glare down. Glare-free light on the other hand, produces a rather gloomy, flat appearance. Even when it is quite bright it is surprising how depressing it can be to look at shadowless faces all day long. The answers clearly depend on circumstances — and on the tasks being performed.

In some situations — for example, air traffic control rooms — accuracy of reading must be all-important. In data-entry applications such as key-to-disc work, the aims are to ensure minimal eyestrain and keep a pleasant-looking environment. And in those applications where a casual user uses a terminal for no more than a few minutes at a time, the ergonomist has little to offer which could be justified economically.

Heat and ventilation tend to present few problems in computer installations. It is important to keep temperatures and humidities within acceptable ranges, but tapes and discs are usually even less tolerant than people. Air flow, however, may need to be examined. Too high a rate of air flow is usually called a draught, but too low a rate is less obvious.

Most complaints of "stuffiness" are in reality complaints of insufficient air flow.

As far as noise is concerned, printers are the main culprits, although there have been big improvements recently. Developments such as the ink-jet printer offer still greater improvements for the future. The great increase in awareness of the importance of controlling noise is due to the comparatively recent discovery that permanent hearing damage can be caused by continuous noise at an unexpectedly low level (if you ever hear someone say "It's a bit noisy, but they soon get used to it" you can safely bet they're slowly going deaf).

This is unlikely to be much of a problem in computer installations though. The more important consideration here is interference with communication. It is surprising how this can be ignored. Probably the most tragic example ever was a few years ago when a terrorist bomb was planted in the City of London. A warning was sent to the Metropolitan Police who had to relay it to the City Police. The message never got through in time — the noise level in the control room was too high for the operator to understand it.

And with noise, once again too low a level can produce unexpected results. Too quiet a room (and they do exist) can be quite unpleasant — and be responsible for reduced efficiency. Once again it depends on what you are doing.

The effects of vibration has been looked at in great detail by ergonomists. In most computer applications few effects are important, but in special cases surprising things can happen. It has been discovered, for example, that vibration from military vehicles can render dot-matrix LED displays completely illegible. An interaction between the "strobe" rate by which decoders are multiplexed to display digits and typical vibration frequencies makes the characters appear to disintegrate.

There is enormous scope for improvement in the provision of adequate workspace. Enough space for people to work — including enough to move around — must be provided, but to the ergonomist it goes further than this. And this point also illustrates an important aspect of the ergonomic approach. It is not enough to look after the "average" person — one must look at the range encountered in the whole population.

Point by point, "limiting cases" are taken — sometimes the largest expected person, sometimes the smallest, sometimes the average. Space under a table top, for example, will be determined by the largest person to be accommodated, while if something has to be within reach the smallest person must be considered. And, once again, the task being performed will have a major impact.

Overall, the ergonomic approach involves evaluation in terms of what they are doing. The right answers depend so much on circumstances that simple recommendations are really of very practical, yet an appropriate design method can offer considerable improvement.

At the same time environmental factors represent the simplest problems which we have to come to terms with as people are to be taken into account. Matching in terms of the more subtle aspects of psychological function demands even more.

But the main difficulty lies in persuading people to adopt a different approach, one which involves the designer tolerating the ambiguities which make humans human.

DEC wins £1m contract to monitor radar equipment

A NETWORK of Digital Equipment computers with communications based on the X25 packet switching protocol is being set up by the Civil Aviation Authority for monitoring and controlling remote radar installations.

Under a contract worth more than £1 million, DEC is supplying the CAA with 24 PDP-11 and LSI-11 processors, and is designing and implementing the applications software.

The network will centre on a dual PDP-11/70 configuration at the London Air Traffic Control Centre at West Drayton, Middlesex, which will be linked to a PDP-11/34 at each of six long-range radar stations located throughout the UK.

Data will be displayed at West Drayton on DEC VT30 colour terminals and remedial action required relayed back to the remote radar station.

If West Drayton fails, each remote 11/34 system can continue under local operation.

New word processing technique

A NEW work measurement technique for word processing is to be introduced at a WP conference in London on June 12 and 13. Called "ESIT" — Equivalent Square Inches of Type", it is described by Frank Jones of Bradford City Council, one of the conference organisers, as more relevant and broadly applicable than traditional methods, enabling laymen to assess the effectiveness of a wide range of different WP equipment.

The conference is called "Word processing in perspective" and according to Jones is intended to give plenty of "hard-edged information". Pat Coen, of Logica VTS, will talk about practical techniques for getting useful work out of a partially broken-down system while waiting for the engineer, and Andrew Hopper from Cambridge will discuss the potential use of the Ring Main (CW, March 15) in word processing.

From IBM, David Lithgow will deal with the Text Routing System which runs on the Series 1 mini. Tom Stonier (Bradford University) and Barrie Sherman (ASTMS) will look at employment effects.

Further details can be had from Global Education Systems in Keighley, 0535-62316.

Govt's DP export figures still in chaos

By Keith Jones

ALL the 1978 export figures for digital and analogue systems are missing from the latest set of Department of Industry statistics on computer sales because of the major inaccuracies in the overseas trade figures for analogue and hybrid computers revealed exclusively in Computer Weekly earlier this year (CW, February 8).

The latest set of DoI statistics relate to the fourth quarter of 1978 and are complete apart from the export figures for the two related categories — digital systems and analogue/hybrid machines.

The DoI has decided to leave them out because the faulty analogue/hybrid figures printed in the first three quarters' statistics for 1978 have not yet been fully revised by the Customs which supplies the DoI with all its overseas trade figures.

The DoI assured Computer Weekly that revised figures for 1978 would appear in the statistics for the first quarter of 1979 which should be published in about three months.

The faulty analogue/hybrid figures would have shown an unbelievable total export figure of £73 million for 1978 compared with less than £13 million in 1977. According to the Customs, the problem was caused by export agents putting other types of computer equipment under the analogue/hybrid heading.

The Customs said that the number of agents involved was fairly small and that they were now aware of what they had been doing wrong.

Customs pointed out that major revisions had already been made to the original faulty figures but that final revised figures would not be released until next month. It is normal practice for the Customs to publish final revised figures for all the previous year's overseas trade around June.

The DoI statistics also include figures gathered from manufacturers on their total sales, including exports, and these show that total sales of all types of equipment increased from £174 million in the fourth quarter of 1977 to more than £255 million in the same period last year.

Progress on statistics

THE computer industry sector working party at the National Economic Development Organisation appears to be making real progress now in its efforts to persuade the Customs to provide more detailed overseas trade statistics for computers.

The computer SWP secretary, Reg Watt, told Computer Weekly that the level of co-operation from the Customs had improved considerably since early this year when Neddy's problems were highlighted in Computer Weekly (CW, February 15).

The biggest cause of discontent in the computer SWP at the moment is that several different types of peripheral equipment are lumped together under the completely unhelpful heading "other peripheral units."

Imports listed under this heading came to £260 million last year but this figure gave no indication of what types of foreign-built peripheral equipment were increasing their share of the UK market.

Watt said that a breakdown into about six different peripheral categories was hoped for.

Gamma group sets up US subsidiary

CONFIDENT that it is bigger than any of its US counterparts, the Nottingham-based Gamma Computer Group has set up a US subsidiary to take a share of the vast US market for Digital Equipment end user systems.

Gamma has been eyeing the US market for some time (CW, November 24, 1977), and the firm's managing director, George Coggan, sees the US as offering far greater potential for overseas expansion than Continental Europe, so Gamma has decided to concentrate on the US.

Advantages offered by the US include no language problems, a similar legal structure to the UK and the sheer size of the market.

Coggan commented, "The sales opportunities in the US are an order of magnitude greater than over here."

Called the Gamma Computer Corp, the US subsidiary is based at Manchester, New Hampshire, a location selected for several reasons, including its proximity to DEC's headquarters in Massachusetts and the fact that New Hampshire offers the special attraction of having no state taxes.

Heading the Gamma Computer Corp as vice-president is Patricia Colbert, a former DEC marketing development specialist whose projects at DEC included setting up the firm's retail computer stores.

With a turnover of about £3.5 million in its last financial year which ended in April, Gamma is a lot bigger than most DEC systems houses in the US and has developed a range of applications packages that will be tailored by Gamma Computer Corp staff for the US market.

All the hardware used by Gamma Computer Corp will be bought from DEC in the US, while Gamma in the UK will continue to buy from DEC over here.

Systime plans US sales drive as well

GAMMA's biggest competitor in the DEC systems business, Systime of Leeds, also plans a move into the US market. The main difference is that Systime will be selling systems software products there. The most important of these at the moment is Systel, the teleprocessing package developed with financial help from Insac, the NEB's international software marketing consortium (CW, April 26).

Systime says that it will not start selling in the US until next year, and that it will go ahead by itself if Insac is wound down as a result of the new government's policy of restricting the activities of the NEB.

Keen to import Apple II

FOLLOWING discussions between the two companies, Keen Computers in Nottingham is to import the Apple II Computer direct from the makers in Cupertino, California.

Keen is setting up a distribution network in the UK and is also expanding its software development operations. The intention is to provide an increased range of packaged software for the Apple

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Packaged software growth

THE market for independent packaged software will grow by about 20% a year, reaching $2 billion by 1983, according to the latest projections by International Data Corp.

Greatest growth will be shown in application software, says IDC, which will take 55% of the market in 1983 as against 47% in 1977. Of utility software, report generators and job accounting packages are tipped to show strongest growth, with an annual increase in revenue of 30% and 35% respectively.

The trend towards distributed processing will boost the demand for communications software, but without lifting system software in general from its position as the slowest growing sector.

The report notes that lack of awareness of third-party alternatives is still a factor limiting the growth of the market, particularly for application software.

Another limiting factor is the increasing effort being made by manufacturers to provide good software, with NCR and Wang in particular "aggressively developing and marketing application software for a variety of functions".

Hidden line

A SET of hidden line routines for graphics system builders has been generally released by Cambridge Interactive Systems Called HLR, the software is written in a strict subset of Ansi Fortran, to ensure portability, and includes an automatic partitioning module.

GILB'S MYTHODOLOGY

Let's make security engineering a serious discipline

SECURITY is critical to many computerised systems. But our methods of designing secure systems are too informal, in my opinion, and this lack of formal design methods is itself a threat to the security of our systems.

The typical book or article on security consists of check-lists of things to consider and lists of "do and don't" rules. None of the many articles and books I have seen on security has taken the trouble to quantify the effectiveness and the costs involved with each technique. I believe that if the author of such books and articles is really expert then they should be able to give some quantitative information about security technique effectiveness and costs. At least the ranges, the expected values, and the formulas or methods for making quantitative estimates can be given.

If we cannot do this, then we really don't know much about the subject, and should not write about it.

One cannot be expected simply to implement the entire list of suggested ideas. That would cause the cost budgets to be exceeded. The cost of security might easily be greater than the value. It is rarely any system user's objective to maximise security at any price. There is a different value in having certain degrees and types of security in any given environment, and the design must reflect this.

In short, we need help to make cost/effective security design and we seem to be getting security maximisation criteria.

In addition, I am sure that certain combinations of otherwise good techniques might destroy each other's effectiveness; "interference" or "thrashing" are well known concepts. So we must get more information about the combined effectiveness of particular techniques.

Before deciding on a set of design ideas for security, it seems to me logical to clarify our security goals. The table below is an example of a detailed "explosion" of such a goal specification which we made for a London bank project. It is a first draft attempt by the bank's own system designers, but it is a lot clearer than their initial attempt, which did little more than give lip-service to the importance of security.

This specification gave us a clear background against which we could evaluate the entire set of proposed security tactics. No more than necessary, but no less either. At a higher level of planning the resource restraints of money, time and human effort are specified to restrain designers to a realistic budget.

In a recent column (CW, April 26) I mentioned a kind of Ohms law: Availability is a function of reliability and maintainability. There is a parallel relationship in the security area.

The system integrity is a function of the attack (or threat) degree and the effectiveness of security design.

Integrity can be quantified as the probability of system survival (in normal intended state) in the face of a more precisely defined set of attack types. In the absence of any security technology, all attacks will succeed. The function of security technology is to prevent attacks from reducing system integrity.

Thus it is important, in evaluating any type of security technology, to know: Which classes of attacks is it capable of thwarting? What is the expected probability of a given security technique for thwarting a given class of attack? What is the expected development cost aspect of the security technique? What is the operational cost aspect of the proposed security technology? Which important side effects can be expected (for example in performance, portability, maintainability, reliability)? Which other security techniques will this interfere with, and how?

Without getting reasonably good answers to these questions, we will be making blind decisions.

I should warn the reader that the above is a simplified description of even more rigorous analysis techniques which some would want to use, but my objective is merely to introduce the concept that security planning can and should be approached in a quantitative and systematic manner if we expect to have a high effectiveness/cost ratio.

This column is intended as a challenge to all writers, teachers, and consultants in the security area to try to quantify their knowledge for our use. As this column is intended to assist those of us who intend to make use of such advice to develop continued intuitive attempts to spread security engineering knowledge, and to applaud all attempts to introduce a greater degree of solid knowledge in the form of quantified estimates of costs and effectiveness of security technology.

Security is a most serious attribute of any system. Let's make security engineering a serious discipline.

ATTRIBUTE DESCRIPTORS / ATTRIBUTE (Level 2)	MEASURE	PLAN	WORST	BEST	EXPLORE TO	NOTE
File Correctness	File audit program 1,000 sample	99·5%	99% OK	100%		Bell Labs Grones Audit
Program Integrity	Distinct module outputs	100%=				
Customer Data Confidentiality	Exposure cases	1 in 5 years			Data classes	
Disaster Survivals of System Components	Double location bomb	99% system OK in one month	90% in month	100% in 24 hours	Threat type	
Auditability	Ease of audit trail	Any trans trail in 5mins	& (plan)	Any figure satisfying audit in 2hours		
Active Aggression	Probability of success	50%			Internal staff Visitor Stranger	
Operator Error Threat	Probability of success	0·1%		0%		

An example of a detailed "explosion" of a goal specification, made for a London bank project.

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SOFTWARE FILE — By Peter Hewitt

SNA users to get transparent CICS

WITH the release of the latest version of CICS, 1.4, IBM has met the growing requirement for users of Systems Network Architecture to interface linked CICS applications running on multiple host mainframes.

The new facility, called CICS Intersystem Coupling, makes use of SNA's Advanced Communication Function to permit transparent resource sharing among any number of CICS systems.

This means that the user is unaware of whether he is accessing local or remote applications and files, the same commands being used in either case. Where for example a program on one machine requires data stored on another, no command changes are needed.

In addition to supporting remote direct access files and DL/1 databases, ISC also gives local programs access to remote queues and applications.

CICS ISC was developed by IBM in the UK and its design was described last week by Peter Homan at a seminar held to celebrate the official opening of a major new building at Hursley, IBM's research and development centre.

The System, he said, depended on installing a dummy application program in the remote machine. This he described as a "mirror", containing ISC-specific code, which handled the link between applications.

The mirror programs have to be set up by a systems programmer, but according to Homan do not impose much overhead, consisting of no more than 200 lines of code. The overhead lies rather in the path lengths, which lead to delays over the SNA network.

Homan, however, pointed out that the aim of a distributed processing design was to have frequently used applications and data installed locally, so that CICS ISC would only be used infrequently and the delays would be acceptable.

Systemsolve's sales up 60%

HALF year results announced by Systemsolve, the specialist ICL software and systems house, show sales up nearly 60% to £650,000 over the same period last year. The forward order book for systems development stands at over £500,000, of which over £150,000 is for export.

Significant growth areas include the company's Northern division and the Middle East. Following the completion of the first phase of a major development in Saudi Arabia, Systemsolve has formalised its agreement with its agent in Al-Khobar into a joint venture operation.

THE Numerical Algorithm Group's Mark 6 Fortran library is now available on the GEC 4000. Tested by NAG in collaboration with GEC and University College, London, the implementation is already used at 10 different sites.

Cincom into applications

BEST known for its DBMS, Total, Cincom has taken its first step into the applications software market with a manufacturing control system for IBM installations also using Total.

Called Manufacturing Material Planning System (MMPS), the software has been run on equipment ranging from the System 3 Model 15 to the 370 range and comes from a newly formed Cincom group.

£100,000 op system contract

ZEUS-HERMES has been awarded a £100,000 contract by Marconi Radar to develop a general purpose operating system for the Locus 18 minicomputer. The contract follows a feasibility study conducted by Zeus-Hermes and is estimated at over 3½ man-years of effort.

Three versions of the operating system are being developed: one supporting the Locus 18 as a slave to the GEC 4070; a stand-alone version; and an online version.

The Locus 18, Marconi Radar's own minicomputer, is sold as an integral part of complete hardware/software systems for a variety of applications. Predominantly radar-based, these include air defence, air traffic control, naval weapon system control, and simulation.

TI plug-in programs

A SOLID state plug-in library of programs for business decision making has been launched by Texas Instruments for the TI 58 and TI 59 programmable calculators. The ninth in a series, it is priced at £32.

Online library uses IBM formats, JCL

A NEW online library maintenance package for DOS/VS has been announced by Westinghouse Management Systems. Developed by Goal Systems in the US, it is unusual in using standard IBM libraries and JCL.

Most similar products, such as Ponvalet/Online and Vollie, use special library formats, partly to save disc space. Westinghouse argues that this detracts from performance, by incurring card image compression/decompression overheads.

The Goal product, called Promt, is by contrast specifically designed for high performance, while a further benefit of using standard libraries is that no conversion is needed when installing (or removing) the product.

Promt updates both the source statement and procedure library online, no batch job being needed. It uses the same partition independent enqueue/dequeue mechanisms as Flee/Flim to avoid interference between concurrent updates.

It can be run either as a stand-alone system or under the Westi TP monitor. In stand-alone form, a DOS/VS partition of around 70K would typically be enough to support four terminal users.

A strong feature of the package is its powerful editing facilities. It provides, for example, a "compare" command in split-screen mode which stops automatically on finding a difference between two books being compared.

It also provides an internal reader, allowing the cataloguing and automatic execution of Promt commands.

Other features include an interface to Power/VS queues and full protection of library integrity against system crash or hard wait while updating.

A natural complement to Goal's Flee/Flim, Promt DOS/VS is available for an additional £35 to existing Flee/Flim users. On its own, it rents at £60 per month, while both packages together are charged at £125. Corresponding purchase prices are £1,320, £1,980 and £3,250.

Under DOS/VSE, prices may be slightly higher. Westinghouse, however, expects that the package will still be considerably cheaper and faster than the corresponding VSE facility, ICCF. It should be able to support Promt under VSE by about September.

The company also made clear that, while rental prices may be adjusted under VSE, users who have purchased Promt, or any Westinghouse DOS/VS product, will be upgraded to the DOS/VSE version at no extra charge.

Status is basis for RAF information system

THE text retrieval package Status, originally developed at Harwell, will be the basis of an information system being built by Leasco for the RAF's Inspectorate of Flight Safety.

The turnkey system, incorporating a Prime 350 minicomputer, will also include 600 Megabytes of disc and four Lynwood VDUs. The terminal equipment will be connected by fibre optic cables.

The software will be written in Fortran, running under the Primos operating system.

Status, which can be run on machines ranging from minicomputers to mainframes, last year received the backing of the Department of Industry, which formed a Status Club to co-ordinate the further development and exploitation of the package (Software File, May 18, 1978).

Dramatic growth prompts Pansophic to reorganise

SIGNIFICANT changes are being completed in Pansophic's European organisation, following a dramatic increase in revenue.

Unaudited figures for the financial year 1978/78 show earnings of $5 million out of a worldwide total of $18 million. For the current financial year, European earnings are projected at $10 million, nearly equalling the worldwide total of $11 million in 1977/78.

Pansophic, which has been established in Europe for four years, has up till now had independent operating companies in each country. Fully autonomous units, these have reported directly to the vice-president of marketing in the US.

The new structure has created a European executive committee consisting of four managers responsible for sales, marketing, administrative and technical matters. The previous managing directors will now become regional managers, reporting to the European sales manager.

Regional marketing, administrative, and technical staff will report in the first instance to the regional manager, but will receive support from the appropriate European manager.

Paradoxically, one implication will be a slightly reduced role for the technical and training centre set up in Holland last year (Software File, October 26, 1978). As the regional organisations grow, they will increasingly handle more of these functions themselves.

Pansophic's Manchester office, for example, looks likely to become the prime centre for customer education and support in the UK and will have a permanently manned telephone answering service for handling technical queries.

Manchester will be the centre of Pansophic's Northern UK region, with the Southern region handled from the London office. The previous UK managing director, Bill Dunn, is to become European marketing director. He will be replaced in London by Michael Powell, as the Southern region manager.

Pansophic's business in the UK last year reached £440,000 and is projected this year at £750,000. As in Europe generally, the major share stems from Easytrieve, which has around 110 UK users.

Panvelet and Panvelet/Online have so far done better in the US than Europe.

Pansophic's other long-standing product, the OS spool management system Pan*De, has this year been relinquished by the company. Marketing was taken over on May 1 by CDC and Pansophic's future involvement will be restricted to support for existing users.

Its executable library protection system Panexec, launched last year, is still on trial in Europe. Although local security requirements have led to about 10 sales in West Germany, European users have up till now found certain features of the package unattractive.

These deficiencies will be corrected with Release 3.1 in September, according to Powell.

The rapid growth of the European business, he noted, meant that European needs would have an increasing influence on product development in general and could lead to the development of features specifically intended for the European market.

● An optional Easytrieve interface to IDMS has brought to four the number of DBMS supported. Incorporating IDMS commands within Easytrieve, it allows IDMS users to examine and maintain their database with Easytrieve.

PROGRAMMER NOTES

Capturing the reader's interest

ALL newspapers, including Computer Weekly, assume that the headline and introduction to a story — usually extending to the end of the first paragraph — are the key to capturing a casual reader's attention.

However; they should not mislead the reader as to the detailed content which will follow. A delicate balance is therefore sought between overstating the significance of the story and just presenting the facts baldly.

Now that computere are once again attracting considerable attention from the mass media, such stories are appearing with increasing regularity — a first since suggesting that major breakthroughs are being reported.

A (minor) case in point comes from the usually reliable pages of New Scientist. Under the headline "Computers Made Simple, the May 10 issue reported: "A university course on programming based on a £600 personal computer has exploded the hypothesis that computers will always be too complicated for the non-specialist to control."

What, then, was at the heart of this breakthrough? A new end-user language, based on non-procedural principles? An intelligent software system, capable of guiding non-experts through the process of system implementation?

Unfortunately not; read on: "Professor Andrew Colin, of the University of Strathclyde's Department of Computer Science, claims 'virtually 100% success' in teaching students to write programs in the Basic language."

The article explains that the success of the course was in large part attributed to providing a Commodore Pet for each student, rather than relying on conventional batch programming methods.

It also points out that Basic is held in low esteem by the academics, as well as being "fairly rudimentary" when compared with some other programming languages.

Still, wouldn't it have been more technically interesting if the opening remarks had been a little less extravagant? Less danger then of alienating the informed reader.

Given the explosion of power in the hands of the computer illiterate in computing, are we now also to suffer from over-simplification seeking by the media in general, by comparison with which the New Scientist example will be a model of factual reporting?

PETER HEWITT

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Puzzler

THIS diagram represents the 28 dominoes in a complete set, laid out on a 10 x 8 field to produce 24 1 x 1 apertures. Twenty-four is a good try, but not the best.

This week's problem is to use only 27 dominoes on the field, and form 28 apertures, which I suggest is the maximum possible total. See page 63 for solution.

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OP SPOT

By Bernard Allen

Why more good training schemes are needed

WHEN Andy Foers of British Aerospace sent me a letter about operator training (Op Spot, April 26) he touched upon a subject of importance to operations staff and opened up discussion on this much neglected area.

I, for one, was prompted into writing a piece about it (Op Spot, May 3) and also asked for other operations staff to put forward their views.

And now a shift leader at an ICL based installation has taken up the issue by relating some of his experiences.

He writes: "When we got our ICL 2903 two years ago, we were completely inexperienced in computer matters. Fortunately for us, our group has its own computer bureau, and it was very helpful to us."

The operators started their training by taking the ICL 2903 appreciation course "which provided an excellent introduction but was a bit hard going because we were unfamiliar with the terms used."

After that, they were sent on a course run by ICL. It was of little use, as he explains:

"Machine time was limited to two half-hour sessions which were shared out among the 14 of us on the course — it meant that each of us got about four and a half minutes on the system."

The course was also at the wrong level for many of the persons attending it:

"One operator with 18 months' experience — he was on the course because his DP manager had insisted — knew more about the subject than the instructor, but didn't say a word for the entire two days.

"By way of contrast, there was a girl typist who had been told by her boss that an ICL 2903 was arriving in two weeks and that she was going to operate it.

"Oddly enough, there was also a DP manager on the course, viewing it before sending his operators along — very sensible, as he probably didn't bother them with it after his own experiences."

However, on returning to his installation he found someone capable of teaching him about the system — a programmer:

"I was lucky because at our site there was a programmer who was also an extremely good operator, and over a three month period he taught me an awful lot, and I didn't pick up too many bad operating habits."

He points out that training should be viewed as an on-going matter and stresses the need for operators to use their own initiative in this regard:

"The most useful thing I have learned is that if you aren't careful you can spend a lot of time searching through files of manuals to find out information.

"What I did was set up a file for my own use, comprising the commands, instructions and parameters for programs which were not run too frequently.

"As I became familiar with a job, I would remove the details from my file and replace them with details relating to another one. This rapidly improved both my operating and temper.

Meaningful names

Linton

SEVERAL weeks ago we had a hint concerning assigning "meaningful" names to George 2 modules from Ron Linton (left) computer operations controller at Manchester Polytechnic (Op Spot, April 26). In essence, he outlined the procedure involved in renaming the modules in order to indicate their function to the operator. Since then Ron has contacted me with an amendment to the hint.

He said: "When I originally came up with that idea, we were on version 8E of George 2 and not the latest, 8G. The hint still stands, but the addresses of the input module, XKYE, and the output module, XKZE, are different. They are now 788 and 785, respectively."

Cutting glare

RESPONDING to possible health hazards from operating VDUs, London-based plastic panel specialists Chequers Engraving has developed a product which it claims, will reduce screen glare — which certain organisations, including AUEW/TASS, have cited as a cause of visual fatigue among operators (CW January 18).

Called Glarechaq, the product is a thin matt coating which is applied to the screen in the form of a spray.

'No need for unions'

WHEN I visit an installation the operators sometimes wish to discuss some of the broader issues affecting operations staff, in addition to talking about their immediate working environment.

And chief operator John O'Reilly, whom I met at Astral Computer Services (CW, May 10) was keen to have his say on operators and unions — something which has cropped up from time to time in past Op Spots.

He said: "As far as I am concerned, there is absolutely no need for DP staff to get involved with unions.

"There are over 10,000 job vacancies in this industry, as shown by the number of job advertisements in the various computer publications.

"So if you aren't satisfied with your installation all you have to do is find a position at another. It's as simple as that."

Any complaints?

OPERATORS often complain that nobody listens to their points of view. Well, Op Spot is listening and Bernard Allen would like to hear from you.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London, SE1 9LU. Bernard can also be telephoned directly on 01-261 8035.

No flats meant a change of job

FORMER TOPS operations student Steve Ward (Op Spot, January 11) was forced to give up his position at the Edgware, North London, site of the Bankers Automated Clearing Services because he was unable to find accommodation in the area.

Steve, who returned to his home in Tonbridge, Kent, and is now employed as an operator at Jermyn Industries in Sevenoaks, told me: "I really liked the people and the work at BACS, but I just couldn't find a place to live in Edgware or the North London area as a whole.

"The company was very good to me and I have no complaints about them — they even gave me time off to look for a place — but it was no good.

"I was a bit fed-up when I first returned home because I thought I would be unable to find a job as an operator near my home. I was very pleased when I got my present position."

According to Derek Pinnock, TOPS operations lecturer at Borehamwood College, it is not unusual for his former students to give up jobs in London because of housing problems.

He told me: "Quite recently I had a student who found himself a job at an IBM site in Wandsworth, South London, and was on the verge of leaving until the operations manager stepped in and helped him find a place.

"But the whole accommodation thing — both when the students are on the course and after they have found work — is a bit of a problem.

"The ladies who run the guest houses and the like, often insist, for example, that everyone has breakfast before 8:00 in the morning. That's no good for someone who has been working the evening shift and wants to sleep in a bit later."

HINT OF THE WEEK

When jobs have to be cancelled under IBM OS

"EXTREMELY useful in the right circumstances, but it tends to be seldom used", is how Colin O'Keefe describes the IBM OS monitor command, the subject of this week's hint.

According to O'Keefe, assistant operations officer at British Airways in London, the command is particularly helpful on occasions when the operator has no option but to cancel certain jobs.

He writes: "If you have to abort a production job which uses catalogued data sets, the system catalogue must be reset before the job can be run again. If that is not done, problems arise, as when data sets clash or it calls for the wrong tape."

Now most operators will check through the job control language listing produced at the end of the job to find out the status of the datasets involved, but not O'Keefe — he proposes the use of the monitor command, as follows:

"If the monitor command is entered before the job is cancelled, the status of all its data sets will be displayed on the screen when it terminates."

This means that the operator does not have to wait around for the listing to be printed before carrying out the recovery procedure. In this context, the monitor command is as follows:

MN DSNAME

"As a continual display of datasets is not usually needed, the monitor may be stopped as follows:

PM DSNAME

O'Keefe points to a further application for the monitor command — setting up a dynamic display of jobs running on the system: "Firstly, you have to set up a display area by using the Control or 'K' command, as follows:

K M,UTME=XX

XX represents, in seconds, the time to elapse between each display update."

O'Keefe suggests that it shouldn't be updated more than once every 30 seconds. This monitor is started, thus:

MN A

He continues, "Again this is easily terminated — PM A — and afterwards the display area should be set back to zero in order to enable full screen display."

The Computer in Medicine: the ever-ready helpmate

The role of the computer in medicine, research and administration will be discussed, analysed and documented at the Medical Informatics Berlin congress.

The congress is for doctors, hospital and administration directors, specialist personnel in institutions and the staff of special service computer centres for medical informatics.

Experts of international repute will be presenting lectures and discussing special problem areas in work and study groups. Main subjects are: health care systems, the influence of informatics on therapeutic decisionmaking, methodistics and technology of medical informatics.

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00-7308	PSU for 7305 & 7306 Disc Drives	£300
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00-7820	Single Asynchronous Interface	£385
00-7821	Single Asynchronous Interface with clock	£385
00-7022	Dual Asynchronous Interface (2 discreet lines)	£485
00-7823	Dual Asynchronous Interface with full modem control	£535
00-7824	Quad Asynchronous Interface 20MA/EIA (4 discreet lines)	£600
00-7825	Octo Asynchronous Interface 20MA/EIA (8 discreet lines)	£1200
00-7826	Byte Interface 8 bit Input/output	£400
00-7827	Buffered Input/output Interface	£300
00-7828	General purpose Interface	£350
00-7830	16 Channel Asynchronous multiplexor	£3050
00-7831	Rom Memory 2K block	£450
00-7832	Microprocessor Diablo Hitype Serialiser	£400
00-7833	Card Reader Interface	£400

VISUAL DISPLAY UNITS

PART NO.	DESCRIPTION	PRICE
00-7752	Fungus MKI VDU & Keyboard	£685
00-7753	Fungus MKII VDU & Keyboard	£895
00-7754	Fungus MKIII Micro-processor based VDU	£995

LSI 11 COMPATIBLES

PART NO.	DESCRIPTION	PRICE
00-7900	Serial Asynchronous Interface switch and programme selectable UART parameters and baud rates (75 to 19,200), switch selectable address and vector, RS232 or 20ma, LSI-11 QBUS compatible, one dual height slot.	£180
00-7901	Dual DLV-11 Asynchronous Interfaces	£193
00-7902	General Purpose Parallel I/O Module: 16 bits input, 16 bits output; interrupt control, LSI-11 QBUS compatible; one dual height slot	£125
00-7903	DRV-11-B 16 bit parallel Interface DMA	£390
00-7904	16 KW Mos Memory	£845
00-7905	64K byte Mos Memory, 300 Nanosecond access, 450 nanosecond cycle, card extractors, LSI-11 QBUS compatible, one quad height slot	£1050
00-7906	Cartridge Disc Controller. Interfaces most RK05 compatible disc drives to LSI-11 Includes cable; one quad slot	£1650
00-7907	Floppy Disc Controller. LSI-11 for most 8 inch floppy disc drives. Uses Group Record Coding for storage of up to 650K bytes per disc side Controls up to 4 drives	£1080
00-7908	Dual floppy disc sub-system	£2575
00-7909	Line Printer Controller: parallel interface for centronics, data 100, dataproducts, and other line printers, includes 8 metre data cable, LSI-11 QBUS compatible, one dual height slot Specify printer type	£195
00-7911	Multiple serial Interface, 4 Asynchronous serial I/F on one dual card one serial line may be used to drive parallel printer	£305
00-7912	Card cage and backplane; 8 quad (16 dual) height LSI-11 QBUS slots; wedged sockets for easy module insertion; 10.5 x 4.84 inches x 11.62 inches.	£250
00-7913	LSI-11 Microcomputer 61,440 bytes RAM operator's console, line frequency clock, asynchronous serial I/O module, extended instruction set, floating point arithmetic EPROM sockets, QBUS terminator, 8 quad slot backplane and switching power supplies. Eleven extra dual slots.	£2647
00-7914	Terminator/Bootstrap Clock module: provides LSI-11 QBUS termination; power-up sequencing; front panel halt/enable switch and indicator; real-time clock; PROM sockets; one dual height slot.	£200

MISCELLANEOUS ITEMS

PART NO.	DESCRIPTION	PRICE
00-7004	Four Slot Back plane	£210
00-7009	9 slot back plane	£368
00-7049	Unibus jumper	£75
00-7085	15pt Unibus cable	£130
00-7810	BPO Protect Cable	£75
00-7230	Bell expansion chassis	£2000

FUNGUS OFFICES:

ENGLAND
Fungus Computer Products Ltd., No 1, Westmorland House, 2nd Floor, Teall Street, Wakefield, West Yorkshire, ENGLAND. Tel (0924) 60274/5/6 Telex 557644

Fungus Computer Products Ltd., Unit 22, Gatewhill Road, Brackmills Industrial Estate, Brackmills, Northampton NN4 0EE, ENGLAND Tel (0604) 62246 Telex 31504

FRANCE
Fungus Computer Products Ltd., 9/11 rue Fessart, 75019, Paris, FRANCE. Tel 202-15-15 and 202-02-64

HOLLAND to be announced shortly

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Dominic L Prunier, Technitron, 8 Avenue Aristide Briand, 92220 Bagneux Tel 010 33 1 657 11 47 Telex 204 792

NETHERLANDS
Rene van Huisl, Rijsenburgerweg No. 27, Poeldijk. Tel 1749 47640 Telex 34522

WEST GERMANY
Heinz Ising, ISI Computer GmbH, Alte Landstrasse 5, 8012 Ottobrunn, Munich. Tel (010 49 89) 60 60 71/72. Telex 5216290

WEST GERMANY
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SWITZERLAND
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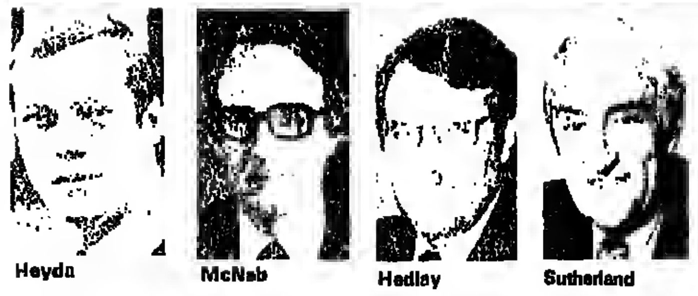
PORTUGAL
Lemos Neves, Ditran Componentes E Electronica Lda., Avenida Miguel Bombarda, 133, 1° p Lisbon. Tel. 545313

PEOPLE AND EVENTS

By Judith Morris



Heyda McNab Hedley Sutherland

Director of games firm

SPECTRUM Marketing has formed a new company to handle the growth of the computer games business which was launched when the first version of Chess Challenger was announced in 1977.

The company, Computer Games, will continue to use Spectrum Marketing as its trading title, and will move to new premises in Barking, Essex.

Marketing director of the company is Sid Heyde. He has spent six years with Ryman, most recently as director of the office machine division, and has since worked for Currys. He will be responsible for the planning and administration of the UK launch of Spectrum's range of computer games.

Graame McNab has been appointed branch manager of Computer Machinery's New Business Marketing branch. He joins CMC from NCR where he was district manager, commercial and industrial.

Les Hedley has joined the leasing company of Wright Air Conditioning to become UK marketing manager. He will report directly to George Wright, chairman and managing director, and his responsibilities will include marketing strategy, sales liaison and promotion. He is a member of the Institute of Sales Management.

John Norris has been appointed sales manager at Orbit Controls. He was formerly a senior applications engineer with the company.

Peter Simpson has been appointed product sales manager for Hamlin Electronics Europe. He has also worked for Astrolux Dynamics as an external sales representative.

President of EEA

The Electronic Engineering Association has elected John Sutherland as president and chairman of the council for the year 1979-80. Sutherland is managing director of Marconi Radar Systems, and a member of the Economic Development Committee for the electronics industry.

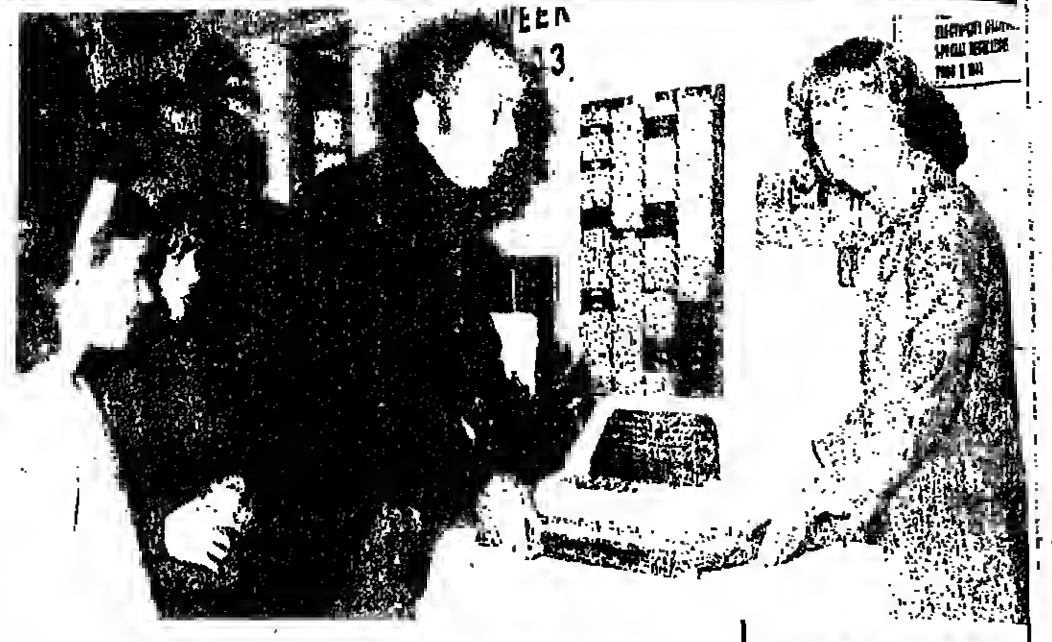
After joining Marconi in 1054, Sutherland worked in the research laboratories on wide band transmission of data and as manager of defence projects.

He succeeds D. W. Morrell, of Racal Electronics, as president of the EEA.

Charles Jomes, a former field sales manager with Channon, has been appointed computer products sales manager for Sandhurst (Stationers).

Robin Adair has become manager of international licensee operations for Cincum Systems International. Since 1975 he has held the position of manager, Nordic countries, and was based in Copenhagen.

Kwan Seng Ng, formerly a service engineer with ITT, has joined Data Logic's customer engineering division to take up a similar position.



Comedienne Dora Bryan is pictured here presenting the R-Range 1500 terminal celebration cake to Derek Aspen, deputy headmaster of the Ovingdean Hall School for partially hearing children. The cake was made by Rosemary Owen and Doreen Stockdale, of Redifon, to celebrate the production of 1500 R-range Redifon terminals manufactured at the Peacehaven factory since April 1978. Dora Bryan made the presentation during her visit to Peacehaven when she met many Redifon employees.

Unilever managers

UNILEVER Computer Services has announced the appointment of Michael McDonald as interactive services manager for the Southern region. He will be based at Burgess Hill, and will be responsible for the familiarisation and training of new clients. McDonald was previously a market research executive for data and telecommunications systems with ITT Business Systems.

Martin Buckley has become southern region sales manager for UCSL. Prior to this, he was a salesman with Burroughs.

Business planning consultant for the company's southern region is Satish Mathur, a former employee of Deloitte, the chartered accountants.

Robin Musham has been appointed vice-president of AVX, the subsidiary of AVX Corp which markets multilayer ceramic capacitors throughout Europe, Africa and the Near East. Prior to joining AVX, he was general manager of Sprague Electric. In his new position he will be responsible for all marketing and manufacturing at the company's Aldershot headquarters, where he will be based.

Malcolm Wood, formerly Honeywell Ireland's branch manager in Dublin, is heading Vydec's campaign in Ireland. The company has opened an office in Dublin, and is to launch its full range of word processing systems at the Computex '79 exhibition in Dublin from May 29-31.

Murlyn Parsons has become sales manager of the Northern area for Metra-Lowndes Ajax. Before joining MLA where he has been in sales for the past three years, Parsons was a sales executive with Lowndes-Ajax Computer Service.

Gerry Palmer has been appointed general manager for information services with Giddings and Lewis-Fraser. He was previously systems manager.

OBITUARY

Tim Murphy

MANAGER of NCC Information Services, Tim Murphy, died suddenly on April 27. He had worked for NCC since its inception, and was responsible for setting up the Information Department, and creating the system with its online retrieval and thesaurus of computing terms.

John Spencer, formerly director of the publications division of Infotech International, has now been appointed director of education and training. He was previously a technical author with ICL. He is succeeded by Jeff Hosler as director of the publications division. Hosler has worked for Infotech for two years, both in publications and special events.

Soccer results

The Computer Weekly Summer football league is well under way and here is the first batch of results —

Division 1
Griffon 7, Datascene 0
Atkins 7, Datascene 2

Division 2
Airfix 3, Datasolve West End 3
SBS 2, Datasolve City 8
Comshare 2, John Lewis 2

Division 3
ICL 1, UCSL 6
3Ms 7, Sherwood CS 0
CJB 2, ICL 4

Division 4
Forest 10, Jadpu 'B' 0
Wellorax 5, Allen Computing 6
CDC 2, Hoskyns 0

Division 5
Ventek 0, NCR 4
Kingston 3, Barrow 2
British Aerosp 2, Gill & Duffus 1

DIARY

MAY 24-25
IBM CUA programming group. Centre Hotel, Portsmouth. 14.00.

MAY 24-28
Computers in critical care and pulmonary medicine. IEEE Computer society. Norwalk, Connecticut. Contact Sreedhar Nair, Norwalk Hospital, Yale University, Norwalk, CT 06856.

MAY 28-30
Satellite and ground packet radio systems: an alternative for data communication networks. ACM Italian chapter. Fast, Milan.

MAY 30
Computer acquisition, avoiding the pitfalls. European Study Conferences and the Institute of Internal Auditors. Quaglino's Hotel, London. Tel: 057 282 2711.
Data manager. MSP. 71 Gloucester Place, London W1. 10.30.

JUNE 4
GEC 4000 series Fortran systems, W.D. Manville. BCS Fortran specialist group. BCS HQ, 13 Mansfield Street, London W1. 10.30.

JUNE 6
Weekly wages by direct credit. BCS. City University, London EC1. Contact Christine Cox, BCS on 01-637 0471.

JUNE 7
Computer [illegible]

printed Fortran programs. M. Nuclear Physics, lecture theatre, Road, Oxford. 18.30.

JUNE 14
Structured Programming. North London Polytechnic, Barking. Details 01-599 5141, ext 49.
Simplicity and approximation sequential pattern identification. Gaines, Oxford University, Keble Road, Oxford. 16.00.

JUNE 20
Who will use the general purpose computers? IDPM. Pearl and Dean, Broadwick House, Broadwick St, London W1. 18.00.
New approaches to systems analysis and design, H. Gearing. Kensington Close Hotel, London. 09.30.
Distributed processing. North London Polytechnic, Barking. 01-599 5141 ext 49.

JUNE 21
Pattern recognition and automation. J. Weaver, Oxford University. Nuclear Physics lecture theatre, Keble Road, Oxford. 16.30.

JUNE 25-27
16th design automation conference. IEEE Computer Society.

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THIS IS HOW FAST YOU CAN GO.

Speed and performance. These are the two features that give you the power of a mini in a 16-bit microcomputer. Our new microNOVA® MP/200 is the highest performance microcomputer in the marketplace.

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The MP/200 is completely compatible with the MP/100 which means that all peripherals and interfaces are interchangeable. And the MP/100 and MP/200 feature the industry's broadest range of compatible field-proven software for program development and execution. Including diac and real-time operating systems and high level languages such as Business BASIC, Extended BASIC and FORTRAN IV.

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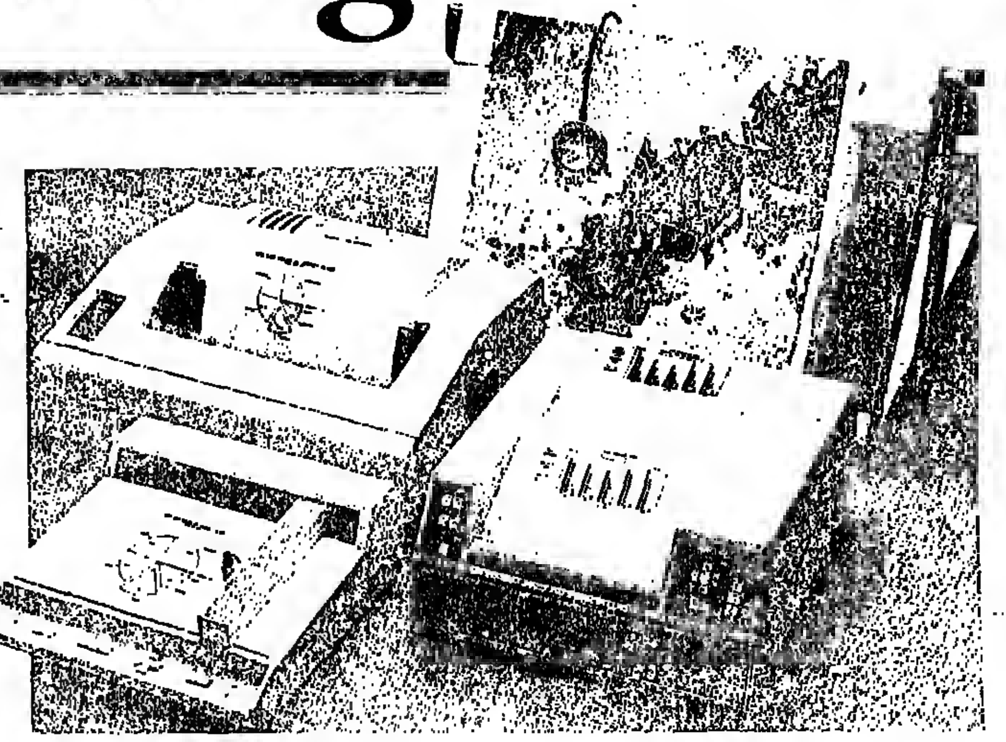
With the 9874A Digitizer, you can easily convert things like photographs, X-ray films, maps, strip charts and engineering drawings into X-Y co-ordinates for your computer or for local storage in the 2647A Graphics Terminal.

And to simplify writing custom graphics programs, we've developed GRAPHICS/1000, a special software package that runs on the HP 1000 computer.

For more information about HP Graphics Work Stations contact your nearest HP Office, or fill in the coupon.



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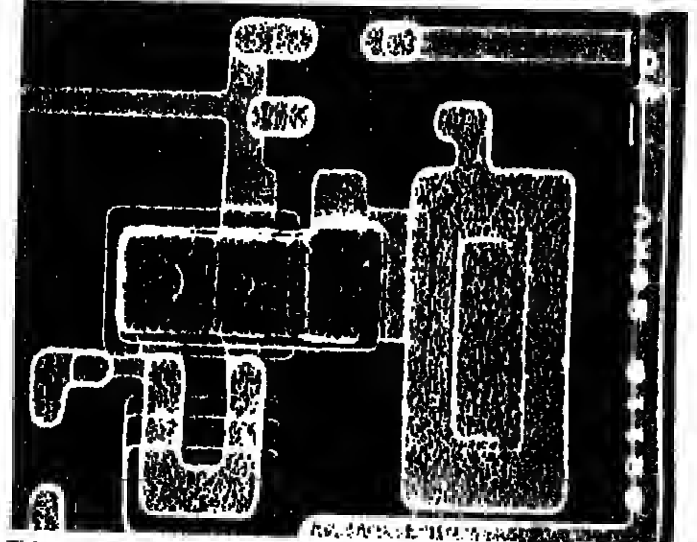
By Martin Banks



This scanning electron micrograph shows the fundamental part of the new Josephson junction circuits developed by IBM. It is the injection gate, which by using direct injection of electrical current as well as magnetic fields for switching, can directly perform an AND function on two injected currents. Its switching speed, according to IBM, approaches the speed of light.

Leap forward in circuit technology

JOSEPHSON circuit technology, the supercooled, superconducting electronic switching technique with enormous long-term potential in the computer business, took a considerable step forward recently with the publication by IBM of details of a new approach to the technology which offers a three times speed increase over existing Josephson techniques.

The details were made public by the company at the recent "First Specialty Conference on Gigabit Logic" held in Orlando, Florida, US by the designer Dr Tushar Gheewala, a scientist at the IBM Thomas J. Watson Research Centre in Yorktown Heights, New York.

The new technique, called Current Injection Logic (CIL), can produce OR gates that switch in as little as 13 picoseconds, which according to the company is a rate that is approaching the speed of light.

To give some idea of the speed of operation, the ratio of a picosecond to a second is the same as the ratio of a second to 31,000 years, give or take a few years.

The actual switching time in the circuits can be as little as 7 picoseconds, with the remaining 6 picoseconds being taken up by the movement of the electrical signal from one circuit to the next. AND gates can be produced that switch in around 26 picoseconds.

These circuits are about three times faster than previous Josephson devices, and over 10 times faster than the quickest transistor logic circuits.

CIL technology differs from earlier Josephson designs in that they use direct injection of current as well as magnetic fields to switch the Josephson junction. The basis of this is a new circuit design called an injection gate. This consists of two Josephson junctions connected by a superconducting inductance.

The most interesting property of the injection gate is that it can directly perform an AND operation on the two currents injected into it.

In addition to increasing operating speed, this design permits operation over a larger range of input currents than was possible with earlier Josephson techniques.

The output signal is also twice as large as earlier devices, and the combination of these permits a larger number of input and output lines to be used in system design than before.

Dr Gheewala has designed OR and AND circuits which have between two and eight inputs, which offer between one and six output lines. Their operating speeds range from 13 picoseconds for a 2-input, 1-output OR gate, up to 41 picoseconds for a 4-input, 2-output AND circuit.

Each additional output line adds about 6 picoseconds to the speed, and the circuits dissipate an average of 6 microwatts of power.

Currently, the circuits are being fabricated using minimum line widths of 2.5 microns, which is about the same as advanced semiconductor devices. IBM is already considering the possibility of using electron beam lithography to reduce this line width to one micron. This would provide a proportional cut in the switching time of the circuits, although the company feels that the main advantage would be to reduce the distance between circuit elements on a chip that the electrical signal has to travel.

Josephson junctions are named after the Cambridge physicist Josephson, who predicted the electrical effects of reducing the temperatures of the circuit to near absolute zero. At this temperature, electrical resistance falls to nothing, and they become "superconductors".

Intellec Editor launched

A NEW Editor for its Intellec development systems has been introduced by Intel, as part of its policy of enhancing its support for software and hardware development.

Called Credit, the new Editor allows users to take a word processing approach to the generation and modification of source programs.

Two modes of editing are provided. The first, screen editing, is for where the section of program to be edited can be displayed on the video terminal completely. Editing is then carried out at the current cursor position, with cursor manipulation as normal.

The second mode, Command line editing, is used where the sections to be edited are too large to be shown completely. Here, the program is held in store, with times of code being called for as required.

Bazaar lectures

A FULL range of lectures and seminars has been arranged to run in parallel with the Great British Electronics Bazaar, an electronics and hobbyist exhibition to be held at Alexandra Palace in London, June 28-30.

Further information and tickets can be obtained from The Great British Electronic Bazaar, 24-36 High Street, Saffron Walden, Essex.

Educational kit for several levels

A STRONG push into the microcomputer teaching arena is now being made by SGS Ates, the Italian-based second source for Zilog microprocessors, with the introduction of its Nanocomputer Training System.

Based on the Z80 micro, the Nanocomputer has been designed using a modular approach, so that a variety of educational levels can be met with the same system. The modules include a solderless experiment station and a variety of optional peripheral systems. There is also a three-volume series of specially written training books for students.

These are geared to three main educational levels. Book one is aimed at students with no knowledge of computers or digital electronics, and this comes with just the basic computer module.

Book two is for students with a knowledge of digital electronics only, and comes with the computer and the experiment station.

For students with more advanced knowledge, book three comes with the computer, experiment station, and specially written educational software.

DOUBLE DOMINO

High Speed Data Modems with Borer's unique performance advantage

The 96 LSI and 48 LSI – two advanced high speed data modems from Borer Electronics. Reliable, economical, adaptable and British made.

96 LSI – a 9600 bit/s modem designed for systems flexibility: single channel (for economy) or 4 channel operation. Sophisticated multiplexer options for full duplex control function transfer, remote unattended multiplexer configuring, dynamic channel assignment. The 96 LSI incorporates extensive local and remote diagnostics and internal dial back-up control to give a comprehensive modem with the best available price/performance ratio.

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What is Double Domino?

It is the modulation technique that provides the ultimate in line performance, knocking spots off the competition.

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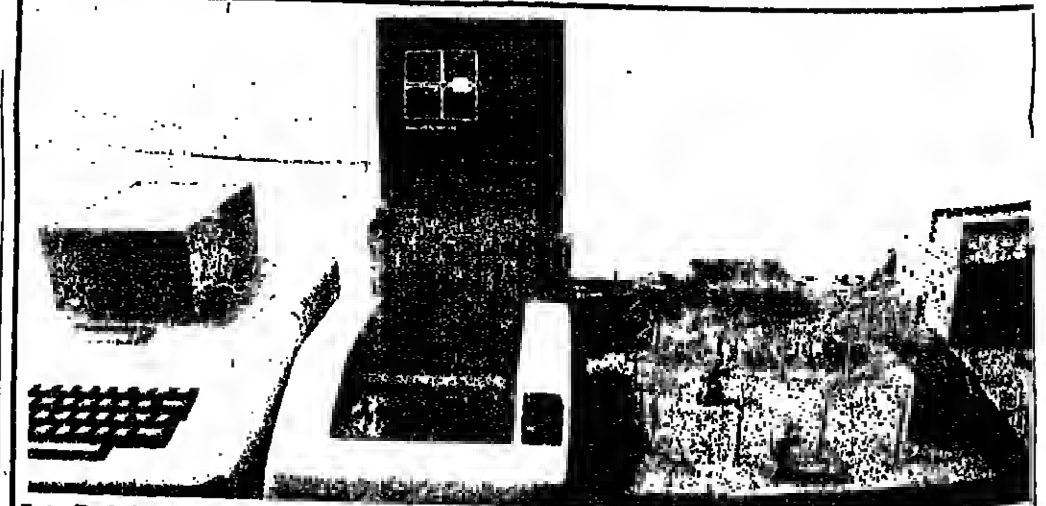


Peter Tooke's model of a security system installation, displaying the use of an Apple II personal computer in the security control system, takes the playing with toy soldiers to a new and elevated level. It is also a serious business.

Apple core of advanced plant security system

THE concept of computer-controlled security is not new but in the past it has proved too costly. The advent of microcomputers based on the microprocessor chip however is now making computerised security systems feasible at a low cost.

Developing such a system was a task recently faced by Peter Tooke, whose consultancy, Norgrange Ltd, was retained by Thor Security.

Tooke purchased an Apple II from Personal Computers as the basis of his solution.

"The biggest danger to a security system — no matter how sophisticated — is false alarms," says Tooke. "If the local police force is used to investigate these alerts, they might become sceptical when future alarms are given or even refuse to act. If the site uses its own reaction force, the same problems apply.

"Also one of the most expensive aspects of security is manpower. One man guarding a spot will be needed in three 8-hour shifts for 24-hour round-the-clock protection.

"With the Apple computer, we could ally the soundest security brain techniques to a program to provide security routines for adequately trained security guards. Furthermore, these routines can be custom-designed to suit a particular site."

To illustrate his system, Tooke has a mock-up model site fitted with magnetic sensors located around the scaled-down site grounds. These sensors are connected to the Apple via a special-purpose circuit board to provide dynamic and up-to-date information on a video screen.

When one of the model toy soldiers is placed on a sensor, the message on the screen changes from "All secure" to indicate an alert condition and its location; for example, perimeter section 3, ground sensor west 2, factory door open, or gas in air conditioning, or any similar message as required.

The security routines can be established by working on a decision tree principle. Projected "line of attack" and targets are calculated continuously from alarm states held in short-term memory. This enables subsequent alarm states to be compared to aid the discrimination of multiple entry, back-up for additional infiltration, and the position and number of rearguards to cover the intruders' retreat.

Speed of reaction is critical to a security situation; the computer can be programmed to take over from the control room supervisor if his reaction is too slow, or if he is attacked and unable to react or forced to take the wrong action. It is also programmed to check out possible false alarms and take security action only when necessary.

Electronics failure in any part of the security structure is immediately investigated by the computer and the supervisor notified, whether this is caused by accident or sabotage. The immediate monitoring of intruders progress allows security staff sufficient time to take necessary counter action.

Survival depends on new markets

In this second look at the Morgan Stanley Forum, held recently in New Orleans, Micro News Editor Martin Banks considers some of the new market opportunities opening up for microelectronics, why the semiconductor industry will not suffer the expected drop in business, and how the new European companies could benefit.

THOUGH industry in general may well suffer a downturn at the end of this year, the semiconductor industry looks as though it will weather the storm, through the opening up of new markets and changes in its relationships with the marketplace. Here the new batch of European producers could well become successful.

Among the new major markets opening up for the industry are automobiles, consumer products, and telecommunications.

In cars, for example, Jerry Rivard, chief engineer of Ford's Electrical Engineering Department, told the Forum that Ford alone would be spending $50 million on integrated circuits and were starting to install semiconductors in engine and driveline controls, driving convenience systems such as interval wipers and speed controllers, and in entertainment systems.

He had a warning for the semiconductor industry, however, saying that for the car industry, device complexity was less important than reliability.

In the consumer products area, Heinz Roessle, group vice-president of ITT Intermetall, said that the obvious market was in TV-like home and business terminals. The microelectronic content would be greater than in current TV sets, and the technology would also be applied to TVs, providing such user functions as automatic programme selection, and voice response station selection.

One of the biggest future markets, however, is in telecommunications, reckoned to be worth $1 billion by 1985. L. J. Sevin, chairman of Mostek, said that telecommunications was now just another application of the computer, with the telephone as an interface. Not only will there be intelligent PABXs and information technology terminals, but the 60 million telephones made in 1985 will have a chip inside controlling dialling, filtering and A/D, D/A conversion work.

The forecast that there is a chance for European semiconductor companies to prosper in future world markets is based not only on the pace of technology development and application, but also on the change in the structure of the semiconductor industry, and its relationship with the marketplace.

The semiconductor industry's primary statistical guideline, the book to bill ratio, is now running at around 1.5:1. This ratio is the difference between the industry's bookings, or orders, and its billed sales. At 1.5:1 it means that the industry is taking half as much again in orders as it is selling.

This is a classic symptom of double ordering by customers, where they place multiple orders for the same product with different manufacturers, and stems from the customers' own increased and unsatisfied demand for the product. It is the standard precursor of a downturn in the industry.

In the past, this level of business has always prompted the semiconductor companies to invest in new plant and equipment, thus expanding production capacity considerably. When the double ordering has stopped, the industry has been left with production overcapacity in a reducing marketplace, and has had to face heavy losses.

This time round, however, the industry is not adding production capacity, even though the demand is there for its products.

Into this scenario falls the new batch of emerging European operations, such as Inmos, GEC-Fairchild, and Eurotechnique. There should, according to Siemens vice-president Dr Gernot Oswald, be opportunities for them to succeed, even though he does not personally see it happening to any significant degree over the next 10 years.

One reason for this is that, though the European market for MOS memory is expected to be $490 million by 1985, and $320 million for microprocessors by that time, the market itself is fragmented and underdeveloped, and lags in product developments. It also has very open trading policies, which have allowed the US manufacturers to capture over 60% of the European market.

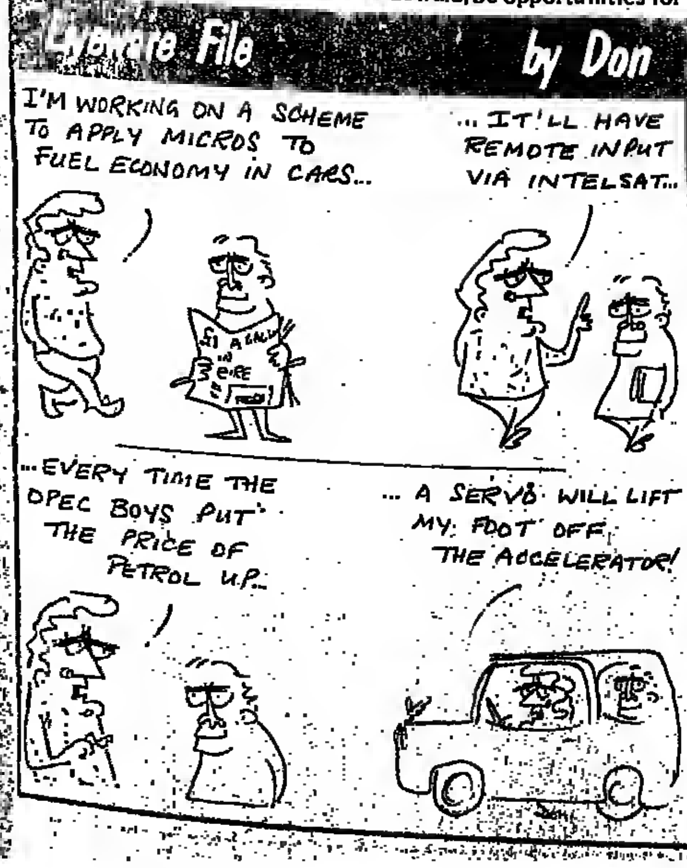
One way round this seen by Dr Oswald is that the European companies should concentrate on developing sophisticated components with a strong systems bias, backing this up with liaisons with US manufacturers. This, he felt, will favour the big, vertically integrated companies.

Distributor may get personal...

At least one US component distributor is seriously looking at the possibility of marketing personal computer systems through its outlets.

Speaking at the Forum, Jack Darcy, president of Kierulff Electronics, said he saw major market potential in the many small businesses and small OEM companies that were not directly covered by the sales efforts of the systems manufacturers.

He said it was already possible to identify 5,400 potential commercial customers, 35,000 industrial customers, and an estimated 1.7 million individual customers for personal computers.



Change in corporate goals essential, says Intel man

A CALL for a fundamental change in corporate strategy in the semiconductor business was made at the Forum by Bob Noyce, vice-chairman of Intel.

The change, one already made by Intel itself, is to start setting after-tax earnings targets rather than aiming solely at gross sales targets, a tendency prevalent in the semiconductor business.

Intel's own financial targets are now to achieve $150 million after tax earnings by 1983. To some extent this disregards the turnover figure needed to achieve it, though the company has always managed to operate at relatively high margins. Previous Intel financial goals have centred around achieving a turnover target of $1 billion by 1983.

Noyce said he hoped all semiconductor companies adopted this approach, for there are inherent dangers in just attempting to purchase market share.

He said that the new approach was essential if the cost of the increasing capital intensity of semiconductor production was to be met.

"The industry will need at least $1 billion per year investment as a minimum from now on," he said, suggesting that "$50 billion would be needed up to 1990 to maintain the industry."

Risk to VLSI development

THE one outstanding risk to further technical development, especially in the push towards VLSI devices, is the growing shortage of cash and people.

This was the view of Al Stein, vice-president of Motorola Semiconductor. "We are looking at a three orders of magnitude increase in capital cost to 1985 in lithography equipment alone," he said, "and the people shortage is acute. The $2.8 billion dollar business was produced by 2,250 key personnel, while the $450 million sports business employed 2,243 key personnel. Colleges, however, are producing sportsmen by the bundle, not semiconductor engineers."

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CWES

Standard protocols for open systems taking shape

The forthcoming meeting of the ISO on open systems standards will have many vital issues to discuss, including the establishment of a consistant standards scheme and the types of liaison which must be catered for.

Frank Taylor, of Systems Technology Consultants and chairman of the BSI committee DPS/20, will lead the UK delegation to the London meeting in June. Here he examines some of the most significant problems that the ISO committee will face.

By Dr Frank Taylor

AN important meeting of the International Standards Organisation Committee on progressive open system standards will take place in London from June 4 to June 15.

Representatives from all interested countries including Canada, Japan, the US, Germany, France, Sweden, Holland — and, of course the UK, the initiator of ISO work in this area — will be present at a meeting of Committee TC97/SC16, which will be looking at many significant problems.

Three will almost certainly come under close scrutiny. First is the "model" or consistent scheme or framework for representing such standards, so that interworking is possible. Next is the decoupling of actual communications standards from inter-system standards, concerned with representation of action and information transferred rather than its transmission.

The third point is the types of liaison which must be catered for, ranging from close-coupled user interactions, such as those found in a time sharing system, through to situations where a system may be sending data halfway round the world.

Looking into these issues in a little more detail, many interesting and challenging problems appear.

First of all, the present practice of basing a model on a layered structure (CW, February 16 and April 13, 1978), is being very carefully scrutinised.

While it is clear that a model must represent the interconnection between the building bricks needed for interworking such as virtual terminal protocols, file transfer protocols, means for data transfer, etc; there are occasions when the rigid layering approach appears to be a little too rigid, and alternative structures will be carefully considered, which allow all types of conceivable transfer to be covered.

Secondly, there is an increasingly good case for decoupling or separating standardisation at the inter-system levels, above the transfer/transmission levels and those within those levels.

At the upper levels the accent is on the interworking of systems — action control, file transfer, including perhaps program transfer — of either source or object code; secure transfers . . . and so on.

On the other hand, the standards for transmission are essentially technique dependent.

While there are now a considerable number of standards for data transmission links, in terms of marshalling information, such as X25, together with X3, X28 and X29 for packet-switched networks, and HDLC variants to cover many circuit-switched needs, there are no standards yet for end-to-end transfers of one job — ie, standards which are task or job oriented rather than link oriented.

There are no standards yet, either, for flow control, that is controlling the flow of segments of different tasks along an available path or paths.

Another need here is for agreed standards, based on development of existing standards, for use when offline media are used for transmission, such as floppy discs, or magnetic tape in one of its many sizes and forms.

Thirdly, the type of liaison which must be considered will almost certainly come into sharp focus. Transfers of information within distributed computing elements fall into three classes. They are:

1. Situations involving the control of transfers by a Network Control Centre — usually at a remote location from the active systems which wish to interlink, which has overall control of all resources, and therefore, according to scheduled events, the creation and termination of sessions so that scheduled transfers can occur when scheduled resources are available.

2. Situations where one (primary) active configuration interrogates another (secondary) active configuration to determine if it can:

A. Accept a proposed transfer in terms of standards used (eg, for encryption, resource needs, information codes, etc.).

B. If affirmative determine when the transfer can be accepted.

C. Actually initiate the appropriate session (which may be two-way, i.e. interactive) at the appropriate time.

These operations are similar to line control operations at the link level.

3. Situations where a message is sent to a destination of unknown characteristics, except that minimal capability to receive and display the message can be assumed.

In some cases a receipt may be requested at the source, in due course. In others, eg where information value decays rapidly with time, a receipt would not serve any useful purpose and despatch must be assumed to lead to receipt. In this case, management information representing the type of transfer and resource requirements, etc will normally accompany the actual message, typically a waybill.

In all cases, the basic elements involved when the transfer is set up are similar, but the speed of transfer and priority, and the sequence of transfer and acknowledgment differ considerably. These will most certainly need to be carefully examined; the whole area is sometimes referred to within ISO as the management of distributed applications.

A number of important, possibly less vital issues, need to be examined. One is the treatment of encryption in open systems standards. Assuming that appropriate encryption techniques, algorithms, and protocols to exploit and apply them are developed elsewhere within ISO, the next question to be answered is where do such standards fit in the architecture? One argument suggests that such standards should be applied at the highest possible level within linked systems, to offer data protection at all lower levels.

Another argument suggests that encryption should only be applied at a level below that at which data compression is carried out. If data is encrypted before data compression is contemplated, then data compression algorithms won't work, since they will not recognise the data it is receiving.

The forthcoming meeting will also need to clearly identify existing standards which can be fitted into the proposed model either in their present form or in modified form.

When the issues outlined above have been resolved, it is hoped that progress towards standards, which will be acceptable to manufacturers, the software industry and users, will be rapid.

While the initial standards produced may not be perfect and perfect, it is hoped that they will emerge quickly in a form which will allow implementers to combine them with proprietary standards for the time being.

Progressive migration to a single set of non-proprietary standards will then become possible, as further standards and refinements within the structure emerge from ISO's work.

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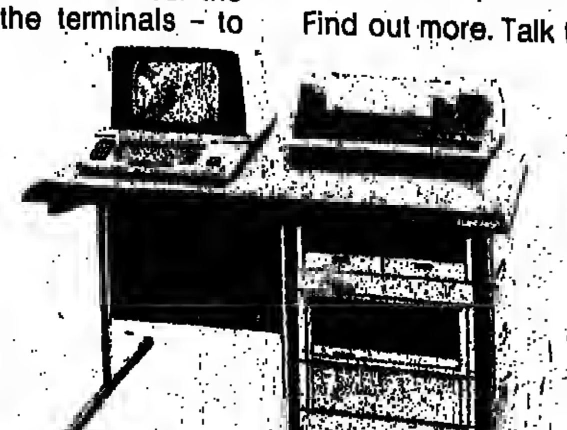

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ANALYSIS II from CASE

'Sacrificial victim'

● **From front page**

save them, pumped huge sums of taxpayers' money into them, and slowly but surely turned them around to profitability and success.

"ICL, for example, was rescued by the State and is now a major international computer manufacturer, paying huge dividends to the NEB. Ferranti, which capsized under private owners, was rescued by the Labour government four years ago and is now buoyant and profitable.

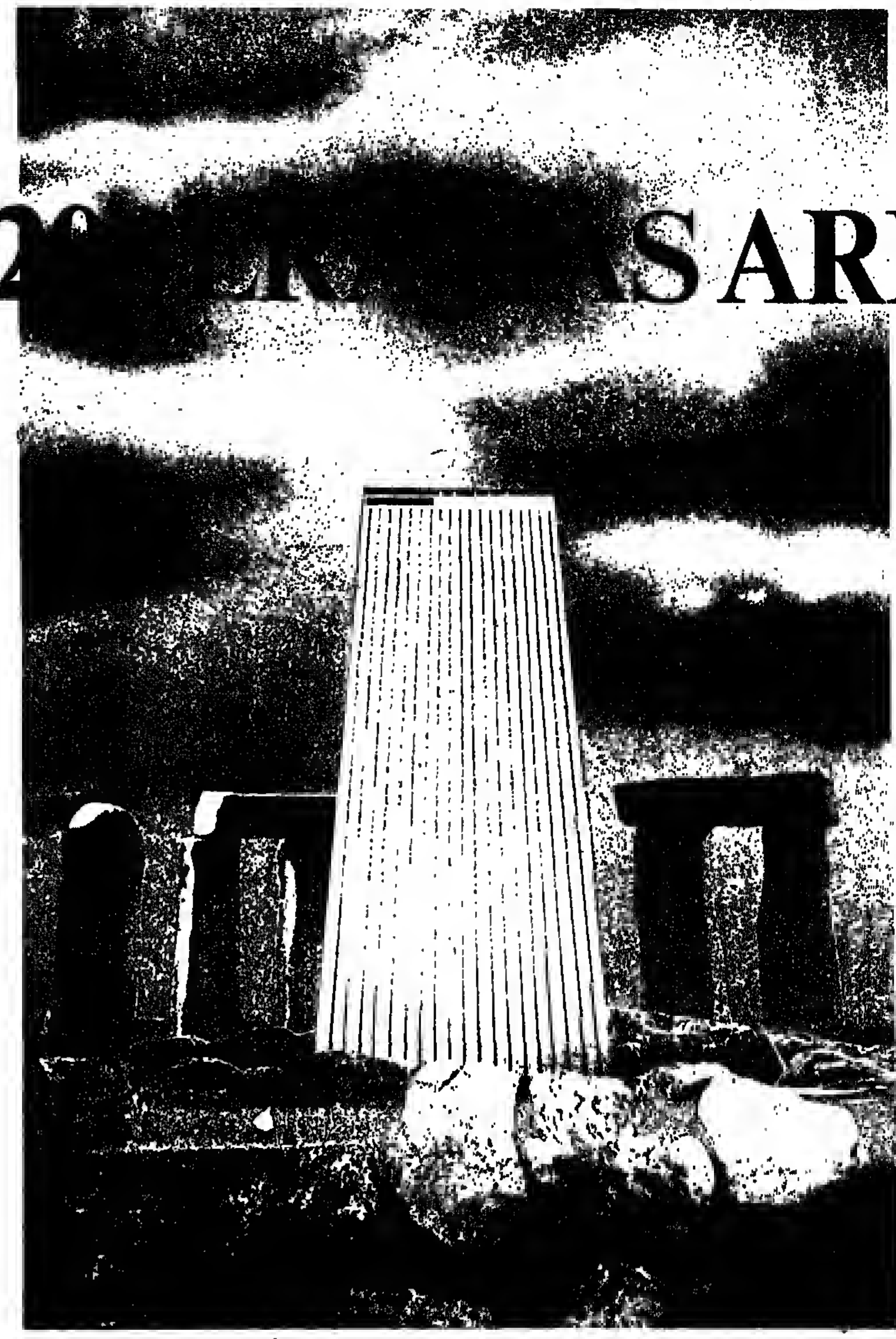
"Now we are told that the same City vultures who would have left those companies as carrion, are waiting to swoop on those tasty morsels which have been fattened by the taxpayer. The improvidence is matched only by the immorality."

know what would happen to new projects. "What of Inmos, which is the most exciting new industrial venture launched in British industry for many years?" he asked.

"Before the election, MPs jostled to have it in their constituencies. What will happen to it now? Will it be the victim of some commercial asset-stripping?"

He also asked whether Sir Keith intended to keep the sector working parties, and whether he intended to attend NEDC. The only answer he got was that Sir Keith did intend to attend meetings of NEDC.

The rest of Mr Varley's questions went unanswered, and in his reply Sir Keith stuck to generalities ...



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The UK's seats of learning could lead world in networks

BRITAIN will be leading the world with its universities computing network if current plans of the Computer Board and the research councils bear fruit.

That is the optimistic view of the head of the newly-formed Joint Network Team, Roland Roaner, who is now settling down to draw up detailed plans and pick the rest of his team.

The iden which tho Computer Bourd (which buys all big university computers) and the Science Rcscnrch Council have come up with is not for a moster plan for a network — that would bc dangerous to try tn formulate at this stage, in Rosner's vlew.

Rnther it la for an upward-compatible spectrum of facilities, invniving a hierarchy of networks on national and local level nnd a range of processors from mainframea to micros.

This is something that is not being attempted anywhere else in the world, Rosner points out, adding: "Maybe nubody else would be so daft!"

Thc nntivation for the scheme, he explains, is the incrensing neeil of acodemics and rcsearchers to rely on communications in get the computing they nced.

"You cnn't satisfy cach department's needs on s singic machine," he says. Pooled computing is already going on, nsing the Computer Board's two national centres in London and Mnnchester, and with resource-sharing within regions, with different packages held at different centres.

In addition to the national centres, there need to be both regional and local networks, and all three levels must be compatible and linked, so thot users are not restricted in what they can nccess by bureaucracy or lack of standards, Rosner says.

In particular, local areo networks are especially important for the exploitation of micros in universities, as has been pointed out to the Computer Boord by Jim Alty of Liverpool University.

A local network would have to be cheap, easy to interface with, and have a high bandwidth in order to enable users to pool their software and their special hardware to the greatest posible extent. An example of auch a system would be the "ring network" developed at Cambridge (CW, March 15).

The difference between thia schenie and oil the networking that goes on in, say, the US, is that thera the networks carry largely terminol traffic.

The UK system will allow files to be transferred between machines, and jobs to be switched to a range of hosts.

The use of graphics over networks is something that is only just starting, Rosner points out, and this requires more elaborate communications than that used by simplo terminals.

The principal obstacles Rosner sees in his path ore: getting manufacturers to adopt standards, and persuading users to follow the scheme and not "do their own thing" by setting up facilities on their own. The first he describes as "very hairy", but it should be greatly helped, he thinks, by the Computer Board's decision to link standards to procurament (CW, May 25, 1978). The second is an ever-present problam in research centres and universities, where

UK universities could heva a system of computing networks unique in the world in its power and versatility if current plans of the Computer Board and the SRC baar fruit. Guiding developments is the new head of the Joint Natwork Teem, Roland Rosner, who talks to Rory Johnston.

"not invented herc" is a common syndrome.

To atart with, the team will have three basic dutles. One, to participate with the varlous centres and institutions in their plsnning, taking a global view, and trying to influence rather then dictate.

Two, ensure that communications and switching facilities are made availablc, both on a national and a local level.

On a national level this would involve liaising with the Post Office over PSS, leased lines, and whatever. On a local level it means looking for standard products from manufacturers and encouraging their davelopment. An example would be the Cambridge ring main systam.

Three, obtain standard equipment for attachment to the network, by placing development contracts with systems housea and universities for instance, and by members of the team contributing to development themselves.

By and large the team will arranga for technical work to be done by other people, but it will be important for tham to do some practical work just to "keep their oar in", Roaner thinks. "Co-ordinate, participate stimulate," is how he auma up the team's function.

The user interface is one tople he la particularly interested in. One will have to be developed that la "user-friendly" he aays, unlike, for instance, EPSS.

How will a uaer get himself connected to a machine at the other and of the country without having to type in 14 digits? That is the sort of problem Roaner is thinking of. He would also like to develop machine-independent command sats.

Another important lob for the team will be helping people test and valldate their systems. For this the team will need some hardware of its own and a central set of testing procedures.

For local area networks, the work most needed to be done at the moment, in Rosner's view, ia development of concentrators and gateways to the outside world.

Looking at his work as n whole, Rosner says: "We need to keep a sense of proportion. We can't have o very complicated arrangment just to connect a micro to a campua network."

It is this task of being all things to all men, of seeing that simple fncilities are provided for some users and very aophisticated ones to others, while keeping the whole thing reaaonably coherent, that promises easily to occupy all of Rosner's time for the next three years.

At present he is ensconced on his own at Rutherford Laboratories, where he first got involved in DP aa a high-energy physicist in the sixties, and was in tha now-superseded network unit under Mervyn Williams.

He has no staff aa yet oport from a secretary (five more professionals sre to maka up the team) nor does he have a boss, which has its compensations aa well as its drawbacks. "I have several shouldara I can cry on."

He has a peripatetic existence, living in Wimbledon and singing in a choir in Hampstead, where ha ruba shoulders, purely by coincidence, with other leading lights of the computer world such as Andrew Hinchley of the ACM, severnl civil servants from the OoI, and evan a staff writer on Computer Weekly (a crowd Malcolm Peltu describes as "the Hampstead Mafia").

The small, select world of computing is getting larger, and Rosner's efforts should make it much easier for them to talk to each other.

Comet designer Borg Christansen damonatrates his brainchild to Bulmershe College's Roy Atherton.

Next IBM 4300 to be a field upgrade

● From front page

there will still be long delivery delays on major products."

So although IBM haa folded-up the so-called price umbrella from tha industry by cutting hardware pricea to the bone, it has in effect replaced it with a "demand umbrella."

This protecta both plug-compatible and rival manufacturers since, in the case of the former, if they can ship something equivalent to a 4341 in a month or two, whereas the IBM machine may be on 18 months delivery, they have a distinct advantage. In the case of companies like ICL and Burroughs, earlier delivery should be sufficient to persuade many customera thinking of defecting to IBM to stay loyal to their existing supplier.

Orlansky reports that in Europe, orders for the 3031 hnve proved very "soft," with substantial numbers of customers converting them to 4341 orders. Chairman of the IBM Computer Users' Association Des Lee predicted that this would happen nt the time of the 4300 announcement (CW, February 8).

Another problem IBM is facing is that the enormous demand for outright purchase rather than rental uf lnrge systems has fallen owuy, according to Orlansky, and although nrders are still well up to plan, outright soles urc well below forecast.

In the past two years, IBM bolstered profits considernhly by achieving high levels of sales, so the unexpected swing hack to rentnl is likely to impact its figures. The company is now faced with a dilemna: shnuld it cut prices further on the 3030 series to hoost outright sales, or will this lead to even more overall demand, pushing delivery dates out even further?

Amdahl is nt present benefitting from IBM's comparatively high 3030 series prices, but longer delivery delays from IBM would tend to drive more business Amdahl's way.

Reducing threat to firms from natural disasters

FIRMS worried about sorious harm to their business cauaed by a natural disaster hitting their computer centre will soon he able to make provnlon for back-up facilities from US firm Oota Processing Securitios for a flat rate of $12,000 a year.

OPS is building six "recovery oparation centres" afound the US, each consisting of enough room for three large IBM computer systems together with room for data preparation, dota control, and programming staff.

Each building will have oir conditioning, pnwer supplies, and communicatlona facilities; everything, in fact, apart from the computer itself, which would be brought in on lease at short notice.

Subscribers who have special hardware such as cheque sorters or OCR readers that could not be obtained at short notice could install back-up units at the centre if they wished.

According to Louis Scoma, DPS president, 80 firms hava already signed letters of intent tu subscribe to the first centre, now under construction in Fort Wirth, Texns.

He points out that what many firms do, namely arrange to share another's machine in the case of mishap, is fraught with dangers as there is often insufficient capnclty on the other machina and nlso compatibility problems.

Dons' concern over heavy use of university centres

A REPORT on the future neads of the national university computing centres is expected to be completed by the aummar.

The National Cantrea Working Party, under tha chairmanship of Professor Roger Elliott of the Oxford University Department of Theoretical Physics, has been set up by the Computar Board following widaspread concern over tha heavy demands that are being placed on the computing centres at London, Manchester and Newcastle.

Londnn presents a particular problem since the CDC 6600 working life and tha 7600 will follow in the not-too-dlatant future. A new building for the London centre haa already bean approved (CW, Fabruary 1).

Tha working party's job is basically fact finding. It la writing to universitiaa asklog what they need, and will then draw up an operational requirement.

After this manufacturers will be aaked whether they can meet the requiremant. The Cray machina is one possible candidata for London, as is ICL's

UK debut likely for Danish micro

AN educational microcomp system designed and bu Denmnrk, and with softwa communicating with 2900 mainfrumes, is being mark in Denmark by ICL as an intelligent terminal. ICL UK hns ested in the machine and decide tu sell it here.

Called Comet, the syste based on tha Zilog Z80 micro chip and is assembled by t Donish electronics firm Aarhus, Jutland.

In addition to the 2900 munications software, a pe terpreter language has been vised, called Comal, whic similor to Bssic but with str structures derived from Pa in order to allow structured gramming techniques to used.

The basic Comet system cludes 32K bytes of RAM keyboard, a Philips cass drive, and interfaces to a standard television set for play and a serial printer. Ar around £1,000, and accordi the manufacturer a la number of orders has al been received.

ICL in Copenhagen is to complete systems based o 2960 or 2904 using Minicom the Comets acting as intel terminals.

The Comet system and C were both designed by B Christensen of Tonder Col of Education. Members of UK organisation Microcomputers in Secondary Educa and Open University staff taken particular interest in machine, and think it will of great value to British ed Comal is apparently very to being a subset of the proposed new language (C September 21, 1978).

Christensen will be in the in June to give short seminars the OU, ICS Headquarters Bulmershe College, Reading while-day seminar will be h at ICL Training Centre, Bu mant, Old Windsor, on June Further information from R Atherton at Bulmershe Co lege, tel: 0734 663387.

Why programmers are in short supply

THE only way to become proficient in programming is to practise it. if this is the criterion of a craft, then, as Jonsthan Hamilton suggests, programmingis s craft (CW, April 19).

To extend this thinking to the necessity for a five-year apprenticeship is, however, going a bit far. Has it ever been demonstrated, in any case, that five years is actually required to master any of the more traditional crafts?

An apprentice is traditionnlly an underpaid dogsbody, and no onewith the oblility, and the will, to become a good programmer is ever going to be content with that — a difference, possibly, between those inclined to mnnual skills nnd those inclined to mental skills?

Before continuing along this thenie, I would like to answer one of Mr Hamilton's questions, why the present shortfall of progrsmmers is so large. This was explained in Hansen and Penney' and the two reasons given there still hold good.

The shortage originates in the financial squeeze of 1971; employers simply stopped taking trainees, and it was some years before even a minority were prepared to recognise their error.

That initial shortsge has grown to the present disastrous proportions because virtuolly no installation takes in a trainee during its first four or five yeors of life.

The continuous improvement in the power/cost ratio of hardware can only result in an increase in the <5 years: >5 years oge-ratio; if the only way of increasing the stock of programmers is a five-year apprenticeship, then the only answer to the problem is an embargo on new installotions for five yenrs! There has to be a better wny.

I entirely agree with Mr Hamilton that this better way is neither a computer science degree nor a few weeks of language training. The ideal way, I would suggest, is somathing between the existing HNC and HNO schemes, with perhaps six months' full-time study, followed by 18 months' part-time. The first six months would provide a solid base and give time for enough actual programming to demonstrate a candidate's worth to a potential employer, with the necessary refinements being added later, in step with practical experience. (BEC/TEC Committee please note.)

It is not for the government, NCC or a professionol body to provide the training. That is available in the polytechnics and colleges of further and higher education — although, as I am suggesting, not in the right mix of college and industrial periods to attract the school-leavers and satisfy the need.

What the government, NCC and the professional bodies should provide is precisely what they do provide: funds, training material and syllabuses respectively.

As to which professional body, Mr Hamilton only mentioned the BCS. Since we agree thot the graduate level is not appropriate, then neither is BCS membership.

Interested employers and students will find the relevant syllabus with the other computing professional body.

GEORGE PENNEY,
Chairman, IDPM Eduoation Committee.

1. Job Trends in Data Processing, P. Hansen and G. Penney, NCC Publications 1976.

Teaching the techniques of DP

MAY I be allowed to comment upon what appear to ba some misconceptions in "Getting Into Computing" (Focus, Moy 3).

Entry into computing is not easy, nor should it be if entry standards are high: on the other hand, the government is spending vast sums of money to provide just the opportunity which your article implies does not exist. The scheme which we operate for the Manpower Services Commission in London and Glasgow provides 20 weeks of intensive induction training in systems analysis, business principles and basic/advanced programming.

In this period, one can "teach" the techniques and "educate" to an appreciation of profassionalism, which for this purpose I take to mean having a pride in one's work and striving to ba of the best. Our success in this field can be judged by the way dnta processing managers are prepared to participate in the scheme and accept our graduates on their payroll — we are nonnally in an over-subscribed position at the end of the course.

The real problem, I suggest, lies alsewhere. It is tha geometric expansion in the data processing industry to a point where there juat are not sufficient educotionalists ovailable to cope with demand — it's all o queation of standords, you know.

ROBERT MOSCROP
Education Director
Allan D'Morias and Associatas (Scotland).

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Success of Honeywell Page Printing System

YOUR report referring to Univac's decision to market the Siemens laser printer (CW, May 3), and stating that this printer ". . . remains the only effective competitor for IBM's 3800 loser printer", is strangely at odds with the current success of the Honeywell Poge Printing System.

A number of major UK companies have instolled or ordered the PPS and during the course of this year the Honeywell system will be going into sites previously the sole domain of Univac, IBM, Burroughs and ICL equipment.

To ua at Honeywell (and to IBM and Univac too, we would guess) that makes the Page Printing System very competitive indeed!

JOHN MacDONALD
Diractor, PPS Marketing
Honeywell, Brentford.

THE EDITOR welcomes letters commenting on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication.

The NEB cracks the whip

AS majority shareholders, the National Enterprise Board cracked the whip on Monday at sn extraordinary shareholders' meeting of Data Recording Instrument and ealled for the joint venture with, CDC for a disc drive plant, to be given approval to go ahead (CW, May 10).

The plan for an £8 million injection of NEB cash to fund the project had been opposed by Grundy of Teddington, which had hounded ORI in the 1950s, because it considered it to be an unsound venture.

The NEB now has approval for the deal, but Grundy's move to block it has still to be heard by the Appesl Courl and the date of thnt hearing has yet to be set.

ICL for Linesman

SOFTWARE support nnd bureau services for RAF West Drayton's Linesman computer systcm, which monitors air trafic conditions in UK air spacc, are to be provided by a recently installed ICL 2950.

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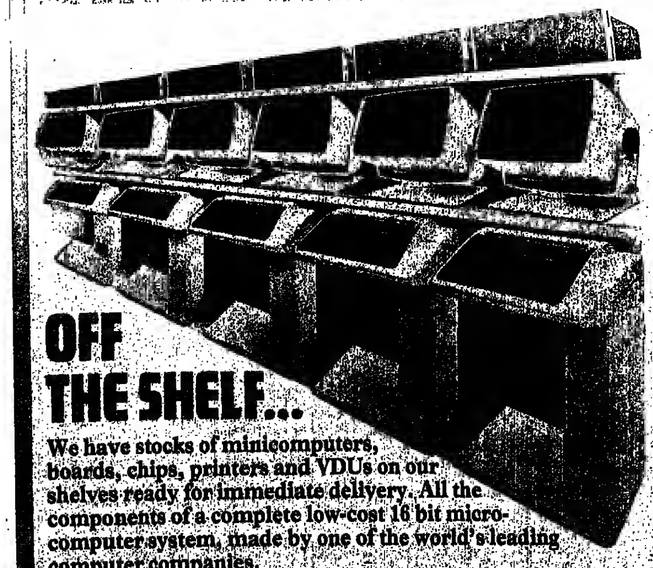

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INDIAN SCENE

Reports by Tim Palmer

Bombay emulates the IMP-16 micro chip set

A BIT-SLICE emulation of the National Semiconductor IMP-16 microcomputer chip set is one of the more unusual projects under way at Nelco, formerly the National Radio and Electronics Company, in Bombay.

Reason for the emulation is that the IMP-16, being fabricated in P-MOS technology, is rather slow, and by doing an emulation using Schottky TTL bit-slices, it is possible to build a compatible processor operating up to 10 times faster. The IMP-16 is, contrary to widespread belief, not a 16-bit microprocessor, but is itself a chip set including four 4-bit register, arithmetic and logic units.

Nelco has a distinguished list of former and present partners, having been formed 30 years ago to manufacture valve radios in collaboration with E. K. Cole of Ekco fame. In the late 1960s it teamed up with the enormous Tata conglomerate which is a £1,000 million group with interests right across the industrial spectrum.

It now has a new European partner, the French arm of Schlumberger, which has 40% of the equity; it builds Digital Equipment PDP-11/34 based data collection systems under Schlumberger licence for the Indian and South Asian markets.

Tata now has 20% of the equity, the remainder being widely held by institutions and the general public. Nelco has an annual turnover of 100 million rupees, about £6.8 million, and is moving strongly into the microcomputer business.

Following the link with the Tata group, which followed a belated entry into the transistor radio market, it was realised that a strong in-house research and development capability would be required if the company was to thrive.

Like a benevolent uncle, the Tata group delegated the Tata Electric Company, a heavy engineering outfit, to establish an R & D centre for Nelco, out of which has come a stream of microcomputer products.

Two basic processors have been developed, one using the Intel 8080 and the other the IMP-16.

Around the 8080, three microcomputer products have been developed: the System 80/1 inventory control system, the 80/2 desk-top scientific microcomputer, and an offline data entry system.

The 80/1 is also a desk-top machine with 64-key board, 20 character strip display, and built-in Shugart minifloppy drive and 40-character journal matrix printer. It comes preprogrammed for inventory control.

The scientific calculator looks identical and allows the user to define up to 26 of the keys, and to write simple programs.

Two products have been developed around the IMP-16 — a ledger-posting VRC primarily aimed at banks, the System 1000, and a rather more advanced business computer, the System 3000.

The IMP-16 was chosen because at the time it was the most powerful microcomputer available. The operating system was developed by Tata Consultancy Services, India's best-known software and services company.

The System 3000 supports upto three interactive job streams and one batch stream, and comes with up to four VDUs, one of which is the console. Memory extends to 64K-bytes, and programming is in Basic or Assembler.

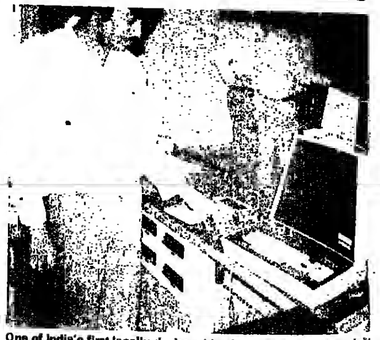
Also supported are up to four floppy disc drives (from Shugart) and a Juki matrix or a Teletype or Texas Instruments line printer. Despite the need to import these items, and some of the integrated circuits, since Nelco builds its own display terminals, the imported content in the System 3000 is only about 15%.

For what is a straightforward microcomputer system which might cost £12,000 in the UK, the Indian user has to pay 350,000 rupees plus another 50,000 in taxes, which works out at about £27,000.

For this he would get the processor, built into a desk, with 56K-bytes of memory, three floppy disc drives, matrix printer and three CRT workstations.

First deliveries are being made now, and the market for the machine is principally as a replacement for IBM unit record punched card machines; however so restrictive is the government in the use of computer systems in business that Nelco has only five orders so far, and the whole market is currently estimated at not more than about 60 to 80 machines.

Business microcomputers are the product of the future for Nelco, the National Radio and Electronic Company, in Bombay, and this leafy glade outside the main factory has been set aside for construction of the new plant. The trees will shortly be felled and the bulldozers will move in — and microcomputers will move out of the large and multifarious factory which also builds radios, calculators and other electronic goods.



One of India's first locally-designed business microcomputers, the N 3000, under final test at the research and development establishment Bombay. Everything in the picture is locally made apart from the fl disc drives, which come from Shugart.

IBM's legacy will see its workers through the bad patches

THE Nelco 3000 business system is being marketed by IBM — the rump of IBM India, which was taken over by its employees when IBM shut down its Indian operations last year.

IBM took over two of the three principal arms of IBM's business: running service bureaux in all the major cities, and manufacturing punched cards — 12,000 million a year at the only atmosphere-controlled card factory in India.

IBM offered jobs to 207 ex-IBM employees, and 178 joined the company. It managed to retain about 80% of IBM's service bureau customers, and operates eight rugged transistor machines, mainly IBM 1401s, at data centres in Bombay, Calcutta and Madras.

The IBM business rose from $1.44 million in 1972 to $5.66 million in 1976; then the boom came down, the company were virtually unable to sell any hardware, and turnover plummeted to $1.09 million in 1978.

IBM has ambitious plans to get turnover back up to $5 million this year, and to make $700,000 pre-tax on this.

But the company is still under-employed, even though financially things are going well, and it is keen to diversify its business beyond the services, consultancy, recruitment services and card manufacture that it currently carries out.

To this end it has signed up distributorship agreements with two US companies, in addition to marketing the Nelco micro system. It estimates the Indian market for large multi-user systems at 15 machines over the next five years, and hopes to win its fair share of the business with an agreement to market the Inte series of IBM-compatible mainframes.

It also wanted to get into the minicomputer market, and has signed up to distribute the Prime minis in India.

Among the projects in which IDM people were involved when IBM was running the company were several electromechanical development projects.

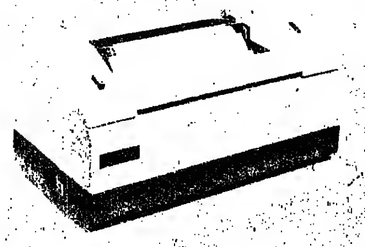
IBM also tooled up to manufacture a locally-designed 120 cps matrix printer for export, but was never given an licence to put it into production.

The new company, IDM, now wants to put this expertise to use and would like to team up with a foreign company to get modern computer equipment into production. It is keen to build data entry systems for both local sale and export, and would also like to put together components and sub-assemblies for export. It has inherited factory space from IBM and is confident that it can have back the trained production people IBM had had.

Observers admire IDM as a thoroughly professionally-run outfit, and believe that the company will prosper, provided that its business continues to grow. But they fear that major problems, and squabbles may break out if business turns down, because nearly all the employees have a share in the company and co-operatives are difficult to run at the best of times.

But the legacy of IBM and

The French Connection



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Rules of the bazaar

INDIAN government policy on the import of mainframes is causing some consternation among major Western manufacturers, because import approvals seem to be granted in a haphazard way. But it turns out that the Indian Government is shrewdly applying the rules of the bazaar to strike a hard bargain.

Two years ago, licences were granted for several large Burroughs systems, and that company's star seemed to be in the ascendant. But last year, most of the major contracts went to ICL, and Burroughs was aggrieved.

What happens is that approvals are granted in batches of four or five at a time, and customers are asked to name their first, second and third choices. If one company's name predominates, pressure is brought on all the applicants to switch their order to that company, whereupon the government seeks a substantial discount for a block order of five machines.

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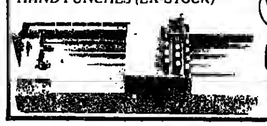
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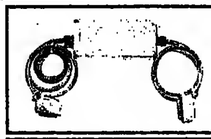
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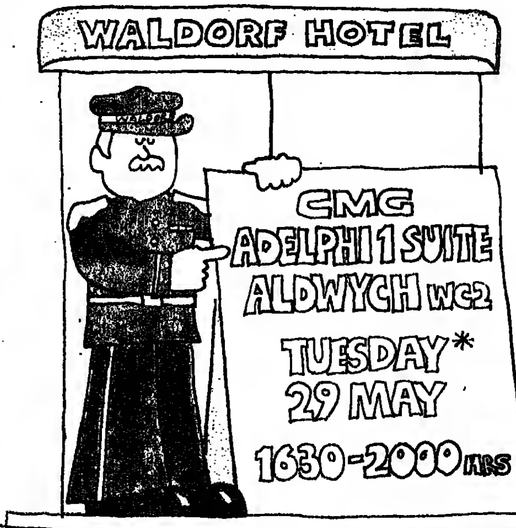

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Burroughs
PDP
Other mainframes (specify)
Other mini-computers (specify)

Applications
Commercial
Financial
Payroll
Production control
Stock control
Scientific
Realtime
Software
Database
Message switching
Communications
Data transmission
Central process
Teleprocessing
MIS*/CPA*/PERT*
Magnetic tape
Disk
Others (specify)

Languages
Cobol
Plan
Assembler
PL/1
Fortran
Filetab
RPG11
Auto*/easy*/user code*
Others (specify)

Job Titles
Project leader
Systems analyst
Systems engineer
Analyst/programmer
Systems programmer
Programmer
Operations supervisor
Operator
Consultant
Sales representative
Others (specify)

Operating Systems
DOS
OS
George (specify)
CICS*/HASP*/GRASP*
DBOMP*/MVT*/IMS*/CMS*
Others (specify)

*Delete where inapplicable.

Position sought Please state briefly the type of appointment you are seeking.

Minimum salary £ _____ Notice required/Date available _____
Signed _____ Date _____

Cut out the whole advertisement and post to the address below.

Knight

Knight Computer Services Limited
Staff Services Division of BOC Datasolve Group and a member of Computing Services Association.
Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

01-491 4706
or when busy 01-439 3411

MINI COMPUTER MANAGER

Salary £8000 c. Plus car

A substantial marketing orientated company based in Essex is seeking a first class computer professional to develop, manage and implement substantial changes to its computing facilities.

The brief will involve choosing a new computer and creating a small team of specialists and to develop and implement new systems for the 1980s.

The right candidate (male/female) will need a creative and hard working mind.

Please respond in writing to the Managing Director, H. O. Marshall, Nor Systems Limited, Valley Road, Harwich, Essex CO12 4RR.

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for
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Contact:
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Field Service Engineers...
"IF YOU'RE AS GOOD AS ME, YOU'LL DO AS WELL AS ME"

"I'm Fred.
That's not my real name...or me in the picture. I'm doing this incognito because my management reckon the competition would soon snap me up. Or at least try to.

"But I can tell you this. I joined Data General as a Field Service Engineer only two years ago. Already, like 50% of the team who joined at the same time, I've had substantial promotion. I came into management. Others went into support. The company's growing that fast!

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If you're as good as me, come and join me! Fred

Data General

Operations.

Location: Rural West Yorkshire.

A chance to join progressive Computer Service Bureau.

Established as one of the leading Computer Service Bureaux in the North West, and a member of a prominent financial group, our client provides a comprehensive data processing service to their parent group of companies and a wide range of external users.

Their continued growth has created the following vacancies in the Computer Operations department where facilities include Univac 1106 and Univac 1108 hardware with extensive communications network.

Operators.

Team Leader and Senior Operator level.
Salary up to £6000 p.a.+20% shift allowance.

We are looking for experienced operators with the ability to hold responsible positions in the team. If your experience includes Univac 1100 then so much better, but we would also like to talk to you if you have either an IBM or Burroughs background – Either way, you should have worked in a Real-Time/On-line environment. Ref. MB/2471.

Operations Support.

Salary up to £6000 p.a. basic
(could be days only or shift work – whichever you prefer).

These positions will appeal to Operators who want to broaden their scope; programming or systems people who want to apply their experience in a completely new area; and those of you with previous or current experience in a similar role who feel like a challenge.

You will be directly involved in all aspects of support, including systems implementation, problem solving, performance monitoring and evaluation. Ref. MB/2479.

Based in extremely pleasant rural surroundings, the company offers excellent working conditions, 4 weeks holidays, regular reviews, formal training and a generous relocation package.

For further information and immediate action, please contact Marilyn Black on 01-828 2115 or 01-828 5356 (24 hour answering service).

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Computing Services Association

John Goldsmith (Computer Recruitment) Ltd., 15 Buckingham Palace Road, London SW1. Telephone: 01-828 5356 – 24 hour answering service. Telex: 916779
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We've made things easy for you!

If you're chasing a new job or a new contract, save time by filling in your application form here and now.

Personal Please write in ballpoint, using block capitals.

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Address _____
_____
Tel. Home _____ Office (discretion will be used) _____
Age _____ Place of Birth _____ Car? _____
Are you prepared to relocate? _____ UK/Abroad (delete)

Experience Place no. of yrs. in box, e.g. IBM 360/370 ... 4

Machines: Please specify model.
IBM 360/370
IBM others (specify)
ICL 1900/2900
ICL others (specify)
Honeywell
Univac
Burroughs
PDP
Other mainframes (specify)
Other mini-computers
(specify)

Languages
Cobol
Plan
Assembler
PL/1
Fortran
Filetab
RPG11
Auto*/easy*/user code*
Others (specify)

Operating Systems
DOS
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Knight Computer Services Limited, 14 Old Park Lane, London W1Y 4NL.

01-491 4706
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MINI COMPUTER MANAGER

Salary £8000 c. Plus car

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MYRIAD
ANALYST/ PROGRAMMER

S.W. LONDON **c.£5500**

This position presents a good career step for an Analyst/Programmer seeking additional responsibility, or a Senior Programmer who wishes to progress towards analysis.

The Company has recently made a major upgrade in machinery with the installation of a dual 3 Mb ICL 2960 VME/B configuration and has a countrywide telecommunications network. The Systems and Programming team work to professional standards and the Company provides formal training to all members of the department.

The successful candidate can look forward to taking total responsibility for a number of interesting applications, involving user contact at all levels.

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Control Data is one of the world's largest Data Services organisations supplying scientific and commercial DP services through batch, RJE and timesharing on Control Data and IBM machines connected through an international network. As part of our rapid European expansion we are in the process of installing 3 additional mainframes including an IBM 3031 at our UK Data Centre alongside our existing 360/65. The 3031 will run MVS with JES2, TSO, VTAM/NCP, RACF and SPF and will be connected to our extensive US and European Data Centres through Control Data's own network software.

If you are an experienced systems programmer with a minimum of one year's experience under OS or VS operating systems you could help install, maintain and develop these complex new systems.

Whilst this job is located in

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you would also be working with our development laboratories in California and IBM in order to provide the latest available software in a challenging environment.

A salary of

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CONTROL DATA
MORE THAN A COMPUTER COMPANY

Junior Commercial Programmer
West Country

An opportunity has arisen within the Plessey Marine Research Unit, Templecombe, Somerset.
We are looking for a suitably experienced man or woman to join a small software team involved in a variety of accounting and engineering support projects.
You should be self motivated and keen to develop new skills. Knowledge of FILETAB/FTL6 and GEORGE III would be useful, but familiarity with any high level language would be acceptable.
A competitive salary will be negotiated in line with experience and qualifications. Generous assistance will be given with relocation expenses, temporary lodging and travel.
Please telephone or write, giving brief career details, to Stuart Carter, Personnel Manager, Plessey Marine Research Unit, Wilkinbroop House, Templecombe, Somerset. Tel: Templecombe (09637) 551.

PLESSEY
electronic systems

UNIVERSITY COLLEGE CARDIFF

LECTURER
COMPUTING MATHEMATICS

Applications are invited for the post of Lecturer in the department of Computing Mathematics. Candidates should have a first or good second class honours degree in Computer Science, Mathematics, or a closely related discipline, and be actively engaged in research. Applications will be welcome from candidates whose research interests are in any branch of computing

Salary £4232 - £8452 p.a. The appointment will be made in the lower end of the scale. Duties to commence 1st October, 1979

Applications (2 copies), together with the names and addresses of two referees should be forwarded to the Vice Principal (Administration) and Registrar, University College, P.O. Box 78, Cardiff CF1 1XL, from whom further particulars may be obtained. Closing date 21st June, 1979. Reference 1802

THE EASTBOURNE WATERWORKS COMPANY

PROGRAMMER

Applicants are invited for the above position in a progressive installation using an NCR Century computer with 96K discs and on-line facilities. Applicants must have Cobol programming experience. Salary will be up to £4,500, depending on age and experience. The job offers an interesting variety of work in a unit undertaking a wide range of applications, and other benefits include 34½-hour week, up to 4 weeks, annual holiday, free life assurance and a contributory pension scheme.

Write or telephone for an application form to: Mr. R. S. Weldon, Data Processing Manager, THE EASTBOURNE WATERWORKS COMPANY, 14 Upperton Road, Eastbourne, BN21 1EP. Tel. Eastbourne 21371.

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As an experienced Computer Engineer you'll already know about Honeywell's new concept in computer printing. PPS ... the first total printing system, non impact, ten times faster than conventional printers.

PPS is a system in its own right. Built around a Honeywell Level 6 minicomputer. Operating off line it can accept output from ICL, IBM, Univac, Burroughs as well as our own mainframe computers.

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An attractive salary is offered, together with a company car and a full range of benefits. No doubt about it, PPS, plus your own initiative and drive will quickly place you among the elite in the customer engineer market. Vacancies exist throughout the UK.

Please telephone or write to Garnick, Fraser Honeywell Information Systems Limited Honeywell House, Great West Road, Brentford, Middx. Telephone 01-568 9191 ext 382.

Honeywell

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Operating Systems Specialists
Germany **£20,000 – £30,000**

Several of our clients still seek operating systems expertise, preferably with a variety of machines, viz IBM, DEC, UNIVAC, CDC, etc.
Work involves the design, program, test and installation of virtual machine operating systems and support software. The ability to design and implement software for an OS/MVS - type operating system is particularly desirable.
Programming is in assembler and high level operating systems languages.
JBA would like to talk to anyone involved with operating systems, even post-graduates involved in research or similar. **Contact: Mike Creamer**

Prestel/Viewdata Specialists
Germany **from £20,000**

Immediate vacancies exist for consultants who have considerable experience of information transmission systems, such as Prestel, Viewdata, etc. Data communications expertise and database knowledge is vital to the positions, particularly where concerned with large mainframes and front-end processors. A user contact background is desirable.
Our client is one of the largest consultancy organisations in the world with over 3,000 employees. On this solid foundation, the company offer real up-market remuneration packages and excellent relocation assistance. Further, the prospects of continuation of projects at very senior levels in a worldwide market place is virtually second to none. **Contact: Mike Creamer**

Education Consultant
London based **Start c. £8,000 + Car**

A background in education and training is *NOT* essential for this position, although an interest in these areas of d.p. is naturally assumed.
Pre-requisites are maturity, sound all-round computing experience (both technical and commercial), and the ability to deal with and advise managers and technicians at all levels.
Our client is the market leader in Video Assisted Instruction, a method used by over 200 U.K. customers for their D.P. and Management training. The appointee will be responsible for clients in the South of England, providing advice and support and helping to develop their training programmes.
The rapid expansion of the training field in computing, together with the outstanding growth of this company both ensure excellent career prospects for an ambitious individual. **Contact: Andy Wright**

Systems Analyst – Support
Berkshire **c. £8,000**

We have been retained by a major computer manufacturer to recruit a Systems Analyst to specialise in the support of production and stock control applications.
Candidates should have at least five years experience in the design development of systems in a manufacturing environment and be fully conversant with the implementation of shop floor data collection and control. A background as a production engineer (or similar) would be considered an advantage. Ability to understand user problems is essential.
Salary is negotiable according to experience **Contact: Jim Baker**

Programmers & Analysts (INSURANCE COMPANY)
Hampshire **up to £7,900 + mortgage subsidy + benefits**

One of the most prestigious insurance services companies in the UK with an impressive 40% growth factor last year, are recruiting additional staff for development work. Many systems are under way including installation of a DMS 2 database and a large real-time terminal network. Completion of these projects opens the way for a considerable number of additional systems thus ensuring creative work for the future.
Programmers must have at least 18 months COBOL experience in a batch or real-time environment. Analysts should have real-time commercial or accounting applications experience preferably at a Senior project level.
First class location, outstanding employment package and a realistic career growth. Call for more details. **Contact: Mike Creamer**

Grads. – Micro S/W Development
Oxfordshire **c. £1-5,000**

A small, highly talented software development team is to be established in the Oxford area in the very near future and opportunities will be available for two or three Computer Science Graduates, preferably graduating this year with either a 1st or 2nd class honours degree.
The company specialises in producing operating software and compilers for micros, so successful appointees will be right at the forefront of technology. An outstanding opportunity. **Contact: Andy Wright**

For further information on any of the above vacancies, please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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A.G.U., a medium-sized and expanding organisation which undertakes systems analysis and programming services for major German companies, has vacancies for

APPLICATIONS PROGRAMMERS

who have at least 5 years' programming experience and a working knowledge of a sophisticated operating system. Applicants should be ready to acquire a basic knowledge of the German language.

The successful candidate will receive a salary of £14,000 per annum (plus travel expenses).

Please write with full details of your qualifications and experiences to Dr. Hennes Hopmann in

A.G.U. Arbeitsgruppe für Unternehmensberatungen eG
Emanuel-Leutze-Str. 17, D-4000 Düsseldorf 11

UNIVERSITY OF LIVERPOOL DEPARTMENT OF PHYSICS

GENERAL ASSISTANT

Active and intelligent person, preferably over 30, to assist generally with running Department's computers. Training provided as necessary. Normal hours of work 9.00 a.m. - 5.30 p.m., Monday-Friday. Salary within range to £3,032 p.a.

Application forms may be obtained from The Registrar, The University, P.O. Box 147, Liverpool L69 3BX to whom they should be returned as soon as possible. Quote ref. RV/597/CW.

UNIVERSITY OF SURREY DEPARTMENT OF MATHEMATICS

LECTURER IN MATHEMATICS (COMPUTING SCIENCE)

Applications are invited for a lectureship in Mathematics (Computing Science) in the Department of Mathematics. Applicants will be expected to hold a good honours degree in Mathematics or Computing Science and have at least three years' relevant post-graduate experience. Some teaching experience would be an advantage.
Applicants should have an active research interest in one or more of the following: Computer Assisted Learning, Combinatorial Computing, Computer Graphics, Microprocessors, Operational Research or Optimisation.
The person appointed will be expected to engage in teaching and research.
Salary will be within the range £4232-£8452 per annum (£4233-£8882 as from 1st October, 1979) according to qualifications and experience.
Further particulars about the post may be obtained from the Academic Registrar (FO), University of Surrey, Guildford, Surrey, GU2 5XH, or telephone Guildford 71281 extension 482.
Applications from men and women in the form of a curriculum vitae, together with the names and addresses of two referees, should be sent to the above

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The main work load will involve giving technical guidance and advice, processing work via direct computer terminals and assisting in the future development of our bureau services.
Applicants should have a thorough programming knowledge that has been gained through experience on large ICL 1900 or 2900 equipment. Experience of the ICL PERT or PROSPER packages would be an advantage.
There are ample opportunities for advancement particularly into the sales area where the earning potential is almost unlimited.
An excellent commencing salary will be paid together with an attractive range of fringe benefits to the successful candidate.
We are growing fast — have you the energy and skill to grow with us — if you have than we will be delighted to hear from you, so write or phone for an application form to: **PAT RABY.**

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Personnel Officer, Computel Limited
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The successful applicant will be closoly involved with e wide renge of clients in the development and management of DP etaff recruitment projects on their behalf.

You are experionced in communicating with management at all levels, and knowledgeable of the problems of controlling the development of data processing from the user and the DP viewpointe. You should possces the obilitiee to ovaluete individual performance, motivation and potential against epecific requirements, and to present your views clearly and concisely, in oral and written communication et high level.

The successful applicant will be offered e remuneretion package to around £10,000, and the opportunity to establish e rewarding and satisfying career path in an expanding organistaioo which ie geared to promoting on merit, ability and pereonal contribution. A range of benefite includes a company car echeme. In addition, opportunities will be provided to work on consultancy assignments in the management consultancy division in order to maintain up to dete DP industry knowledge.

Please write briefly and in complete confidence to ANTHONY SPURR, Executive Selection Division, requesting a Personal and Professional History form, quoting reference G726, at the address below. Applications from either sex.

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York House, 199 Westminster Bridge Road
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Telephone 01-633 0866

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An exceptional opportunity is available to a limited number of experienced, competent and ambitious programmer/analysts or sales people throughout the U.K. who have some minicomputer and business applications experience.

If you feel you have the ability and strength of character to own your own business, but are handicapped by only having limited capital, then write to us now with full C.V. address and home telephone number. All replies will be dealt with in the strictest confidence.

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Social Science Research Council Survey Archive

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Applications (two copies), including a curriculum vitae and the names and addresses of two referees, should reach the Registrar (AG/74/CW), University of Essex, Wivenhoe Park, Colchester CO4 3SQ, from whom further particulars may be obtained, by June 7, 1979.

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Supervisor, Computer Operations.

Location: London.

Up to £8,800 p.a.+benefits.

A Computer Operations professional is required by an established international company to be responsible for the day to day running of their computer room activities.

This position will use to the full your administrative, technical and management abilities for you will be responsible for controlling, motivating and providing technical guidance to an operations section of 10 people.

Their data processing is centred on an in-house IBM 370/125 under DOS/VS and POWER/VS with links to an IBM 370/158 MP under MVS/JES 3 at a European location. It is, therefore, essential that you have worked in both DOS and OS environments. At least six years' operations experience including supervisory responsibilities in a medium/large IBM 370 installation is required and it is probable that you have also received some formal management training.

As you can see, the demands are high but then – so are the rewards, as there is ample challenge and opportunity.

If you are aged between 25-35 years, professional in appearance and manner and have the desire to succeed, then you will enjoy and appreciate this environment.

Based in a pleasant area of London, the company offers a starting salary of £7800 p.a. – £8300 p.a. London Weighting Allowance (at present £548), Luncheon Vouchers (£1.05 per day), a very good contributory pension scheme, BUPA and four weeks holidays. Ref. 2328CW.

Please apply to Marilyn Black on 01-828 5356, who will be pleased to arrange immediate interviews.

John Goldsmith Computer Professionals

Computing Services Association

John Goldsmith (Computer Recruitment) Ltd.,
15 Buckingham Palace Road, London SW1.
Telephone: 01-828 5356 – 24 hour answering service.
Telex: 916779
Recruitment Consultants
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DEC Senior Systems Programmer

Croydon

The Scientific Division of ISA–UK provides a service to the scientific and engineering community within Philips industries via a timesharing and scientific batch processing facility. This is based on a 512K DEC 2060 coupled to an extensive communication network including synchronous links to two IBM mainframes.

We are looking for a Systems Programmer, men or women, to join a small team which has total responsibility for the systems software. You will be mainly engaged in developing both major and minor enhancements and facilities in the systems software area to meet our users' requirements. You will also advise management on new hardware and software installations, as well as implement, test and maintain manufacturer's software releases.

Ideally, you should have a degree or equivalent in science or engineering, but the main requirement is for considerable experience on large timesharing systems which will include at least two to three years system programming on DEC–10 or, preferably, DEC–20 equipment. Your programming experience will have given you complete familiarity with MACRO and at least one high-level scientific language.

If you are currently earning £6,000 or more p.a., this opportunity will interest you, with benefits which include five weeks' holiday, pension scheme, discount on Company goods, and relocation expenses. Longer term there are opportunities, if you wish, to diversify your computing experience, or to broaden your career, in a large Company with progressive staff development policies.

Phone Mike Endacott on 01-688 7768 if you would like to discuss details, or contact ISA–UK Personnel Department, City House, 420–430 London Road, Croydon, CR9 3QR. (phone 01-689 2186 ext. 28).

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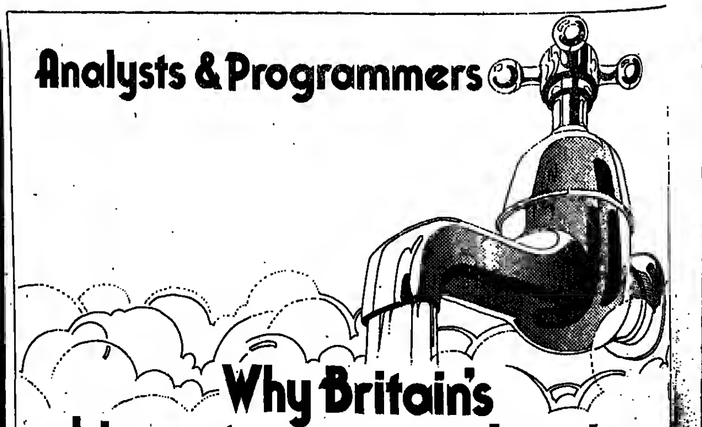

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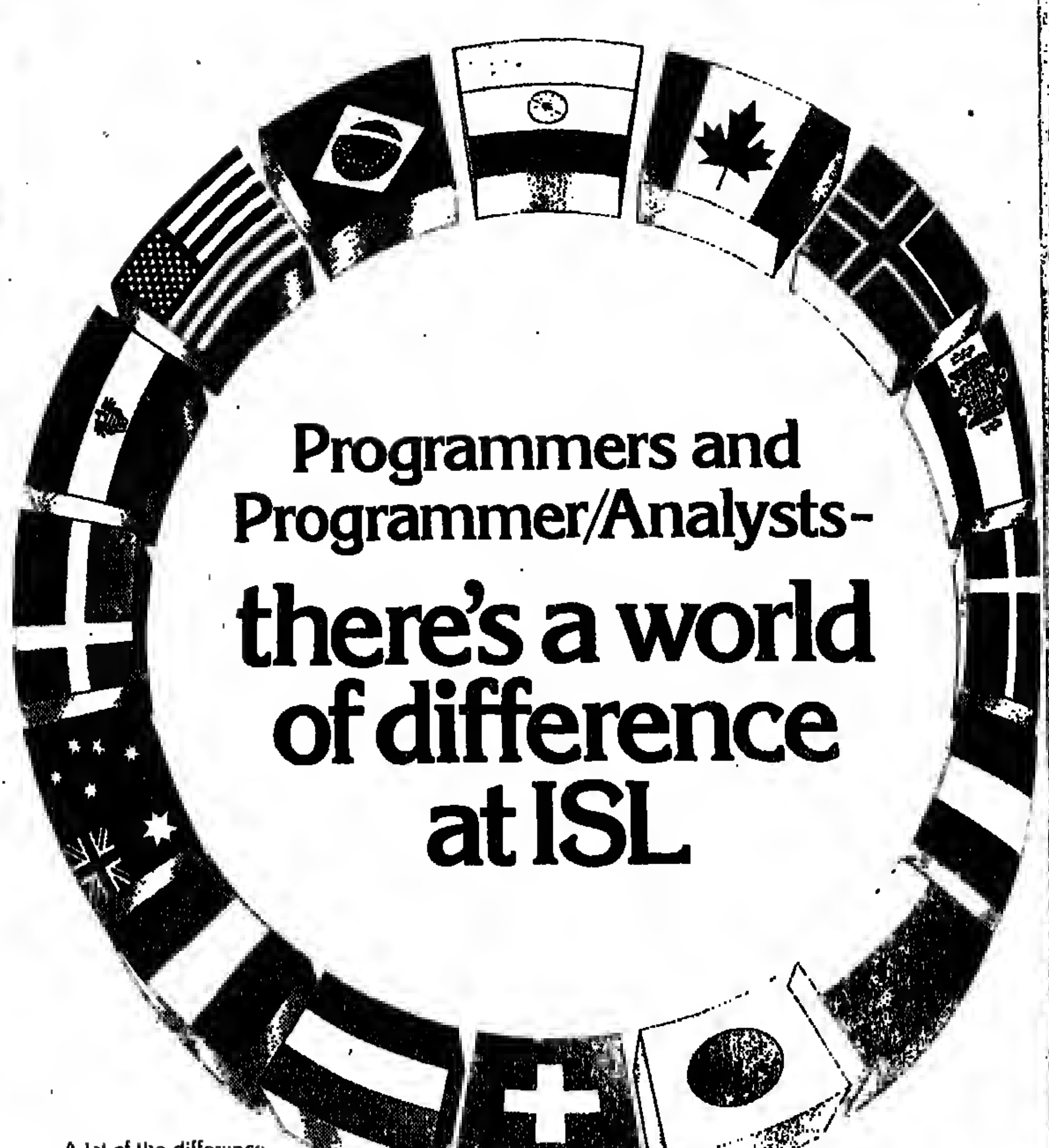

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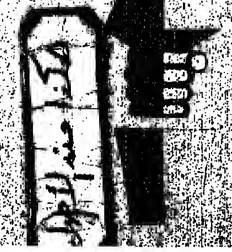

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THE COMPANY: Our client has its corporate Head-Quarters in Wisconsin, U.S.A. servicing subsidiaries and associate companies throughout Western Europe. Within United Kingdom the Group covers the areas of Life Assurance, Specialist Motor insurance, Re-Insurance, Investment, Property Estate and Farm Management.

THE PEOPLE: (a) SYSTEMS ANALYSTS:- The successful Systems Analysts will be required to conduct the initial feasibility studies, develop system proposals and program specifications. The role will also include liaison with the prospective users and senior personnel within the Management Services Unit. It is an advantage (although not essential) to have had current or recent experience in either a financial or insurance orientated environment. The promotion prospects are excellent in the medium term since opportunities will occur in both technical and line managerial spheres.

(b) APPLICATIONS PROGRAMMERS:- There are several vacancies for Applications Programmers to work in the Re-Insurance Team developing a new on-line system. You should have had ASSEMBLER programming exposure preferebly under DOS/VS and CICS although obviously experience within a larger scale OS installation with an independent supplier's T.P. monitor is acceptable. Candidates who wish to gain experience of working with Teleprocessing will be trained in the use of CICS.

(c) SENIOR PROGRAMMERS:- There are two vacancies for Senior Applications Programmers to work in the Life Assurance and Motor Teams. Candidates should offer a minimum of 4 years combined COBOL and ASSEMBLER experience together with current or very recent exposure to a T.P. monitor.

(d) SYSTEMS PROGRAMMER:- A single vacancy exists within the Technical Support facility for an experienced Systems Programmer offering an in-depth knowledge of Assembler programming. The successful candidate must have been involved in the generation/implementation of DOS/VS as well as tuning and monitoring the performance of the existing software. At present, program development is carried out via the terminals using LIBRARIAN ON-LINE and therefore past knowledge of an on-line and real time installation is a decided advantage. Candidates must be prepared to participate in the evaluation of new software from IBM and the independents and to assess its relevance to the installation's requirements.

THE PROJECTS: Currently the Systems Project Teams are responsible for initial feasibility studies, development, implementation and subsequent maintenance of various systems in the fields of Life Assurance, Motor Insurance and Re-insurance. The U.K. Head-office has recently ordered an IBM 3031 to supplant the existing IBM 370/148 operating under DOS/CICS/VS. In addition, the company has already installed IBM 3790's at its Regional Offices to provide up-to-date Distributed Processing facilities.

THE BENEFITS: The higher than averaga salaries reflect the prominence of these key personnel. Additionally, extensive benefits include Free Life Assurance, Free membership of a permanent Health and Medical Scheme, Insurance Discounts (e.g. motor), low rate Contributory Pension Scheme, free B.U.P.A. membership, subsidised restaurant, interest free Season Ticket Loan and flexible working hours.

THE INTERVIEWS: Initially, our Recruitment Consultants will conduct preliminary interviews at their London office after which candidates will be short-listed, to meet the company's Systems Manager and Data Processing Manager. Offers of employment will be made promptly. It is hoped that all appointments will be taken up during the month of July.
Please telephone either John or Lin on 01-491 4636

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Applications (two copies), giving details of age, qualifications and experience, together with the names and addresses of three referees, should be sent to the Assistant Registrar (Personnel), University College of North Wales, Bangor, Gwynedd LL57 2DG, from whom further particulars may be obtained.

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is considering a replacement for a 20 Keystation CMC Series 5300 Data Preparation machine early in 1980; outline proposals indicating methods of operation and levels of cost should be submitted by interested suppliers not later than 16th June, 1979, to: The Computer Manager, Norfolk and Norwich Joint Computer Department, County Hall, Norwich NR1 2DH.

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In reply please quote Ref. No. 4424/IP.

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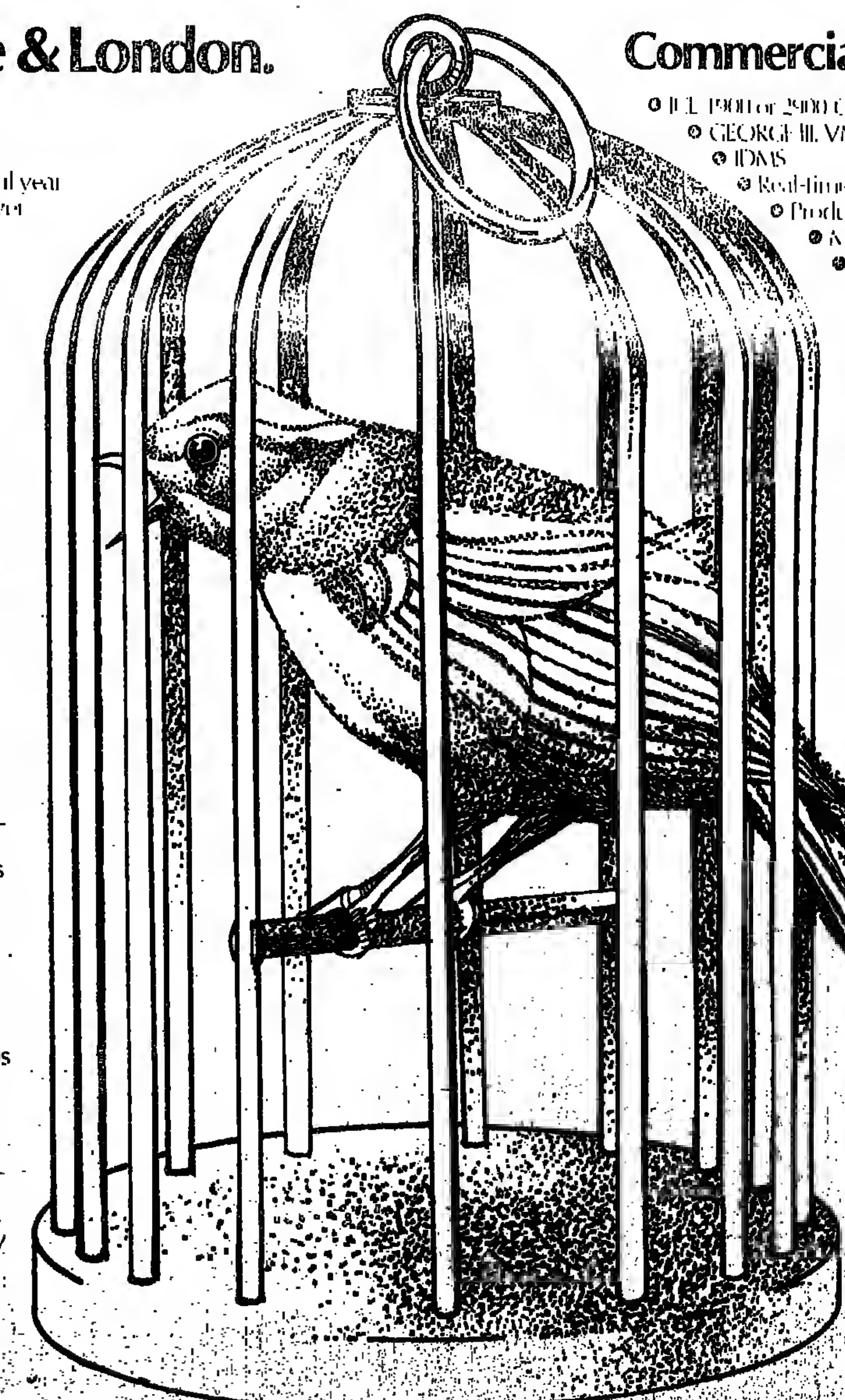

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NORTHERN APPOINTMENTS

What Manchester does today...

By Val Halliwell

"What Menchester does today, London does tomorrow" rune the old adage. And it is e saying that Val Halliwell, managing director of Victoria Appointments, quotes in this survey of the job market in the North of England. Already buoyant, the market is likely to become even more so as the North-west in particular is set to benefit from the microelectronics industry.

THE job market in the North of England continues to be buoyant, and is likely to become even more so as the North-west in particular is set to benefit well from the microelectronics industry.

Microelectronics will provide a net increase of at least one million jobs in Britain, France, West Germany and the US by the late 1980s. The major share of this, something like 60%, will go to the US, as they have responded quickly to this challenge. Britain's share of the rest will depend on how quickly we can respond to the challenge.

This conservative forecast comes from a two-year £1 million study by the well-known management consultants Arthur D. Little. The UK government was one of the 60 clients who sponsored this study. They only looked at the impact of microprocessors and microelectronics in four main sections which are expected to undergo the greatest change. These are: Cars, consumer gonds, business communications and the manufacturing and process industries. All of these industries are well represented in the North of England.

This technology presents an optimistic picture for the future.

As far as technical staff are concerned, there are currently obvious opportunities in an industry where there is still a shortfall of some 27,000 staff. Fortunately, the many training courses, including the government TOPS courses and university degree courses are now producing potentially good candidates who, given the right opportunities and continued training will go some way to alleviating the pressures, although despite the recognised shortage of skilled staff the potential trainee will still experience great difficulty in obtaining his first post, as for many years a considerable section of the industry was simply not interested in the problems and expense of training and supervising new recruits.

Having recruited his staff, it is the DP manager's responsibility to ensure that their commitment to the work remains as high as it is when they first take up their jobs, ie, motivation.

Just what motivates the DP team is far from clear. Certainly current salary levels, although improved of late, are seldom the main criterion. Neither are such motivational factors as responsibility, working conditions or job security, which is the main reason we are now seeing previously unheard of long service bonuses being awarded after 18 months' service, cars with the job (even at chief programmer level), mortgage facilities, foreign travel etc (the North West having several international airports). Key points are more likely to include career opportunities, status, job satisfaction and performance.

Generally, though, I feel that the North can and does offer excellent opportunities for personal progression in a variety of areas. Traditionally the North grew up around the manufacturing and engineering industries, having been quick to computerise. It can therefore offer skilled computer staff the whole spectrum of applications ranging from the pure scientific to the sophisticated production and inventory control, in addition to the service areas of banks, insurance etc.

Also, we are now well into the phase of minicomputers, Digital Equipment's PDPs, IBM System 32, 34 etc, reversing the trend somewhat, as usually an existing employee can quickly be trained in RPG II or Basic + and subsequently becomes DPM.

Such installations, which often require support from software houses, have precipitated the tremendous growth of software houses and bureaux, particularly in the North, where in the last 12 months alone we have seen several newcomers to this scene.

Again, this provides an exciting prospect for the young computer professional wishing to gain experience of a variety of machines and projects, in addition to the travelling aspect, which brings us to the subject of the freelance.

There has been a change in attitude in the North to the freelance over the past year or so, in that his value is now recognised. Several Northern employers are now able to offer both short and long term contracts.

Difficult employment legislation coupled with the lack of experienced candidates in the area of permanent staff have contributed to this demand; the contract staff themselves being engaged on anything from clearing up backlogs of work, caused by staff shortages, conversions to new machines, to development of new software for manufacturers, all of which requires a high level of competence, responsibility and reliability on the part of the freelance.

Looking around the region generally the indications are of development and progression, as we consider the new towns of Warrington and Skelmersdale alone, in the Liverpool/Merseyside area, where we have a number of major companies moving in from the South, offering experience on European networks, together with companies committed to continued expansion, introducing new techniques and facilities expected for the 1980s, thereby presenting heavy demand and exciting challenges to computer development staff.

A little further afield, into Yorkshire, the picture is much the same, where we find heavy requirements in the sectors of users, bureaux and software houses for all levels of experienced staff in Hull, York, Leeds, Halifax, Sheffield and throughout the county.

In Lancashire and Cheshire the trend continues, with demands for experience in online and time systems being predominant.

All this activity is promoting the return to the North of England of young hopefuls who, having become disillusioned with the high cost of living and transportation in the South are quickly able to re-establish themselves into an area where the quality of life is second to none, offering first class support to the sporting world, the arts and in general facilities for a great life. Whether to be seeking a bachelor pad or a family home, all his needs are catered for in the North of England at a price that he can afford.

What was the old adage? What Manchester does today, London does tomorrow.

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Group Leader (Systems & Programming) — Salary c. £7,000
2 Programmers — Salary c. £5,000

The Group Leader, Systems & Programming, will be responsible for developing, implementing and maintaining financial, commercial, batch and ON-LINE control systems based on an IBM 370/138 DOS/VS installation. Duties will also include monitoring, motivating and supervising a team of 3 Systems Analysts and 4 Programmers. The successful candidate will therefore have the necessary 4-5 years' D.P. experience.

The Programmers will have at least 2 years' experience in COBOL programming and will be responsible for writing and testing complex computer programmes.

Our Client offers good terms and conditions of employment, being a market leader in the leisure industry.

Ref: CW01579

LEEDS

2 Systems Analysts — Salary up to £6,000
4 Programmers — Salary up to £5,500

Our Client, a well-known company in the Retail/Distribution industry, now wishes to augment their development teams engaged on Industrial/Commercial telecommunications projects on a nationwide network based on a dual Honeywell 66/20 using IDS Database.

They now require 4 Programmers with approximately 2 years' COBOL experience in a batch of real-time environment and 2 Systems Analysts with 2/3 years' experience of commercial systems design.

The Company can offer you excellent career opportunities in a stimulating business environment together with a first-rate remuneration package.

Ref: CW04579

HULL

Systems Analyst — Salary up to c. £6,200+
Analyst/Programmer — Salary up to c. £5,500+

Our client, a multi-national company, have embarked on an exciting phase of on-line development with their Univac 90/80 computer, offering a challenging environment for professional staff.

Systems Analyst — An ideal opportunity for a Systems Analyst with at least 2 years' experience in systems coming from a programming background.

Analyst/Programmer — This can be a real career step for a skilled COBOL programmer who has gained some systems experience.

The Company offers good career prospects within a progressive department and of course all the normal benefits commensurate with a large company including training as required, assistance with relocation if needed and excellent sports and social amenities.

Ref: CW02579.

NOTTINGHAM

Senior Programmers — Salary up to c. £6,000+
Programmers — Salary up to c. £5,000+

Our client, an established systems house supporting a wide variety of exciting DEC mini computer projects, wishes to make the above appointments due to further planned expansion. The successful candidates will have genuine capabilities of general commercial accounting/manufacturing applications, etc., preferably in an ON-LINE/MINI COMPUTER environment, together with sound experience of BASIC and/or COBOL, again preferably on minis.

Outstanding applicants with p. experience on mainframe may be considered.

The Company offers excellent opportunities for personal progression together with the security of terms and conditions of employment akin to any large concern.

Ref: CW05579

NORTH-WEST

Senior Operators — Salary £5,350 + Bonus

Due to continued development our client now requires a number of Operators with upwards of 3 years' experience gained in a large mainframe environment, e.g. 1 megabyte + to take up these broad vacancies.

Our Client offers excellent working conditions and terms of employment including substantial fringe benefits package and a clearly defined career path.

Full relocation expenses are available.

Ref: CW03579

NORTH-WEST

We are always looking for Professional Freelance Programmers, Analyst/Programmers and Systems Analysts with at least 4 years' sound experience.

We can offer you:—

— Competitive Rates
— Continuity of high quality assignments
— Professional Guidance in all financial matters
— And of course all the other facilites you can expect from an established organisation with a high reputation.

Ref: CW06579

For application form in respect of these and many other vacancies, please contact: Miss Val Halliwell

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MAGNETIC NORTH

LEEDS/MANCHESTER

Sales Executives — to £15,000 + car

Our clients are well established in the mainframe computer market and in order to achieve their planned increase in market share they wish to recruit additional Sales Executives.

Candidates should have a proven track record in data processing sales and whilst not essential a knowledge of the northern region would be an advantage.

Attractive remuneration packages consisting of a high basic salary plus commission will be negotiated. A company car will be provided.

Reference: CW/79030.

TYNE AND WEAR

Computer Operations Manager — c £8000

Our client a large industrial organisation based in Tyne and Wear wishes to recruit an experienced Computer Operations Manager.

The installation which will service on a bureau basis the needs of a number of group companies, is currently a 370/148 but due to rapid expansion a 3032 will be delivered in early Autumn.

This is an outstanding opportunity for a mature operations professional and an attractive remuneration package will be negotiated including relocation expenses in appropriate cases.

Reference: CW/79031.

LEEDS

Our client a leading computer user wishes to recruit a number of development staff to work in a new 2970 installation.

Systems Analysts — to £6000

These vacancies require from 2 years commercial systems experience. A programming background would be desirable.

Programmers — to £5500

Opportunities for COBOL programmers with from 1 years experience to 3+ years for the more senior positions.

Technical Specialists — to £6000

Vacancies for systems programmers and operating systems specialists, particularly with knowledge of GEORGE III.

Reference: CW/79032.

VARIOUS LOCATIONS

Programming — £4000 — £6000
Systems Analysis — £5500 — £7000

We are engaged by a number of major companies throughout the North who wish to fill vacancies in the above salary ranges. Currently we have opportunities in Merseyside, Lancashire, Yorkshire, Humberside and Tyneside.

Not all of the positions are advertised specifically and therefore we have a continuing need to meet professional staff who are interested in developing their careers.

Why not contact us for an informal and, of course, confidential discussion which can be arranged at a time and location to suit you?

Reference: CW/79033.

Ivor Norton Management Services Ltd
Recruitment Consulting Division

57 Shaftesbury Avenue, London W1V 7DE. 01 734 8862. (24 Hour answering service) P.O. Box 63, Copthall Tower House, Harrogate HG1 2 JS. Tel: 56625

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MANCHESTER

143/4 ROYAL EXCHANGE BUILDINGS

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CURRENT CONTRACTS INCLUDE:

PROGRAMMERS/NORTH — c £220 p.w.
Immediate 12 months contract for Progremmers/Oesigners on GEC 4080 with production control experience.

PROGRAMMERS/MIOLANDS — c £230 p.w.
Programmers required to work in a manufacturing environment on POP 11 equipment using RSTS/E, Besic + 2 end Mecro 11. Contracts are 6 month plus.

PROGRAMMERS/NORTH & MIDLANDS — c £220 p.w.
IBM 370 COBOL & PL1 progremmers required to work on varioue contracts throughout the North & Midlands.

PROGRAMMERS/NORTH & MIDLANDS — c £220 p.w.
Experienced Honeywell progremmers with GCOS end COBOL required for varioue contracts throughout the North and Midlands varying projects.

PROGRAMMERS. SNR. PROGRAMMERS/ NORTH WEST & MIDLANDS — c £220 p.w.
3 months, 6 months plus contracts for COBOL or assembler programmer on Univac 1100 series.

PROGRAMMERS/NORTH WEST — c £225 p.w.
Mark IV programmers required to work for our northern client. Contracts of 3 month plus.

PROGRAMMERS/MIDLANDS — c £230 p.w.
Varioue length of contract for programmers/senior progremmers with CICS, PL1, OL1 experience. Under OOS/VS davelopment application.

PROGRAMMERS/MIDLANDS & NORTH — c £220 p.w.
ICL 1900 experienced progremmers with COBOL, Plan, File Teb end Driver, to work on various projects throughout the North end Midlands.

PROGRAMMER/DESIGNERS NORTH — c Neg. p.w.
Programmers/Dosignars required to work on POP1,1 running under RSX11 using CORAL 66. Process control environment. 12-month contract or less.

SENIOR PROGRAMMER/NORTH — c Neg. p.w.
Our Northern client requires, Ferranti 700 experienced progremmers for interesting 3 month + contracts.

PROGRAMMERS/MIDLANDS — c £230 p.w.
Our client requires experienced COBOL progremmers with IMS (both OB & DC) for development work. Contracts 6 months plus.

CURRENT VACANCIES INCLUDE:

SYSTEMS ANALYST/SCOTLAND — c £6500
Our client requires e systems enelyst with Honeywell exporience for work connected to North Sae oil developments. Ref. 1148.

SYSTEMS PROGRAMMER/LANCS. — c £7500
IBM end CICS experience are raquired by our cliant, an international concern. Ref. 1150.

PROGRAMMERS/LIVERPOOL — To £5500
COBOL progremmers ere needed to work on IBM herdwere in an expanding inetalletion. Ref. 1148.

PROJECT LEADER/MIDLANDS — £6300 +
Increese your seniority, exporience necessery for thie position includes ICL/COBOL/PLAN. Ref. 1140.

PROGRAMMERS/DERBYSHIRE — To £6000
FORTRAN programmers are required to work on OEC equipment. Pleesent location. Ref. 1123.

SYSTEMS DESIGNERS/LEEDS — £6000 +
Productivity payment end relocation expenses offered, 2900 experience an advantage. Ref. 1075.

SYSTEMS ANALYSTS/THE NORTH — £6500 +
Subsidised mortgege with relocation expenses. Analysts required to work on advenced IBM herdwere. Ref. 1136.

PRDGRAMMERS/YORKS. — To £5700
Lucretive benefits offered to COBOL progremmers with ICL experience. Ref. 1071.

PROGRAMMERS/NORTH MIDLANDS — To £6000
Our client requires COBOL progremmers to work on Honeywell equipment. Pleasant environment. Bonus Scheme and relocation expenses. Ref. 1151.

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- Tell you thet we need SENIOR ANALYST/PROGRAMMERS capable of both carrying MAJOR PROJECTS FROM CONCEPTION TO IMPLEMENTATION and playing a major role in the MANAGEMENT TEAM of this NEW end RAPIDLY EXPANDING installation?
- Tell you thet we would prefer you to have experience of some of the following: Order Entry; Menufacturing (Accounting end Planning); On-Line interactive systems; RPG II?
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VACANCIES IN THE NORTH

WE LIST BELOW A CROSS-SECTION OF THE PERMANENT VACANCIES ON FILE, WHICH CLIENTS OF OURS HAVE RETAINED US TO FILL. THESE REPRESENT ONLY A SMALL PERCENTAGE OF THE VARIOUS POSITIONS CURRENTLY REGISTERED WITH US. FOR MORE INFORMATION REGARDING THESE, OR OTHER POSITIONS, RING SPIRODON NOW!

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UP TO £9,000 p.a.

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370 — Big Comp. Benefits — To £8,500
102. **COMPUTER MGR.** — Leeds
370 — Good benefits — Neg.
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370 — OS/VS1 — To £8,000
104. **PROJECT LEADER** — Liverpool
370 — Good Opportunities — To £7,500

SEMI-SENIOR
UP TO £7,000 p.a.

105. **TEAM LEADER** — Birmingham
Software Specialist — To £7,000
106. **PRINCIPAL ANALYST** — Liverpool
H/W 66 — Relocation exp. — To £7,000
107. **SYSTEMS DESIGNER** — M/CR
360 & POP 11/70 — To £7,000
108. **SYSTEMS ANALYST/ PROJECT LEADER** — Staffs
1902T — Commercial — To £7,000

OTHERS
£4,500-£6,000

109. **SEN. ANALYST** — Midlands
370 — Commercial — To £6,000
110. **PROGRAMMER** — Liverpool
POP 11 — Basic + — To £6,000
111. **SEN. PROG.** — Birmingham
370 — OS/COBOL — To £6,000
112. **SYSTEMS ANALYST** — Liverpool
H/W B4/50 — Retail — C. £5,500
113. **SYSTEMS ANALYST** — M/CR
ICL — WILL train — To £8,000
Senior Programmer
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Fine Arts Developments Ltd. an international company based in Preston has, over the last 10 years, been one of the UKs leading growth companies whose main activities are mail order, manufacture and distribution in the UK and overseas. The company is introducing new hardware including an IBM 3031 with laser printer and distributive processing units (8100s and 3750).

The introduction of new hardware allows new thinking, to take advantage of increased computer facilities.

Project teams will be set up to examine existing systems and coupled with a planned training programme, will provide a first-class platform for people to enhance their personal and technical skills. Suitably qualified applicants should be ambitious with a desire to broaden their knowledge on a new and technically advanced machine.

Attractive starting salaries will be backed by a first class package of benefits, including relocation expenses, awaiting those fortunate to work in this progressive environment.

Telephone us NOW to arrange an immediate interview 061-491 1666.

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CW/24/5

NORTHEAST & NORTHWEST VACANCIES

LEEDS to £4500
COBOL PROGRAMMER
Excellent opportunity for young COBOL programmer who is seeking user liaison and a chance to work on mini hardware.

YORK to £5000
PROGRAMMER PL/1
Experienced PL/1 programmer required for a professionally run installation. Indepth commercial experience coupled with a good educational background is required by a well established IBM user.

DONCASTER £5000
COBOL PROGRAMMER
Our client seeks an ICL COBOL programmer with not less then 18 months experience in a commercial environment. Able to converse at all levels and assist O.P.M.

LEEDS £4500
COBOL PROGRAMMER
Excellent position available for experienced ICL COBOL programmer. Young go-ahead installation, excellent conditions of employment.

HULL to £6600
SYSTEMS ANALYST
Commercial systems analyst may look forward to an exciting future in systems development with our major client. Good working conditions and attractive salaries.

TEESSIDE to £7000
PROCESS CONTROL
A major user of real-time computer based process control systems seeks additional analysts and programmers experienced in CORAL 66, ALGOL or RTL 11. Experience of POP's an added advantage.

NORTH YORKSHIRE to £7000
POP's
Our major clients in North Yorks are now seeking further Technical staff with in-depth knowledge of PDP 11 - RSX 11 M. Excellent positions in well established organisation.

LEEDS COBOL PROGRAMMER to £5000
COBOL programmer with at least 2 years commercial experience and a desire to work with on-line development in a progressive installation would find this position a challenge.

LEEDS SYSTEMS ANALYST to £8000
Commercial Analyst with experience of at least one major system, and a programming background required for a leading installation developing on-line systems.

LEEDS £4500 + Bonus
BASIC AND BASIC + PROGRAMMER
Experienced BASIC and BASIC + programmers required to join a go-ahead group. Knowledge of POP's an advantage. Excellent promotion prospect with this dynamic company.

SOUTH HUMBERSIDE to £5000
COBOL PROGRAMMERS
Opportunity exists for experienced COBOL programmer who have indepth knowledge of commercial applications and a desire to move over to systems analyst.

HULL to £5500
COBOL PROGRAMMERS
Experienced COBOL programmer with knowledge of IBM 370 hardware sought by our major client. Go-ahead installation with existing on-line system.

LEEDS COBOL PROGRAMMER to £5000
COBOL programmer with at least 18 months commercial experience required by our leading client. Opportunity to join a well established professional organisation.

BRADFORD to £5500
COBOL PROGRAMMER
Our client seeks an additional programmer to compliment their expansion plan. Exciting new hardware. Your career can grow as the installation grows.

Phone **IRENE ROGERS** on **LEEDS 444185** (daytime) or **LEN CRAY** on **LEEDS 687118** (evenings and weekends) to find out more about these or any other positions you may be seeking in the North.
Alternatively, write with brief career details (no stamp required) to Lorien Computer Services, FREEPOST, Leeds LS7 3YY.

ROSSENDALE
SENIOR COBOL PROGRAMMER c £5000 + Benefits
Go-ahead commercial organisation is seeking a COBOL Programmer with 3 to 4 years experience to lead small team. Variety of absorbing systems and user contact.

CHESTER £5500
COBOL PROGRAMMERS
Experienced COBOL programmers with some ASSEMBLER, are required to write application software and packages for minis. Leading Software House offering excellent prospects.

LIVERPOOL
ANALYST/PROGRAMMER c £5100
IBM System 3 user requires an Analyst/Programmer with a sound RPG II background to work on interesting applications. User liaison and opportunity to see systems through to completion.

CREWE
COBOL PROGRAMMERS to £5700
Well established organisation needs programmers with a variety of experience to meet expansion. An opportunity to work on large TP systems with the latest Data-base techniques. ICL 1900, 2900 or System 4 background preferred.

LIVERPOOL
SYSTEMS ANALYST to £5800
Large UK based Company requires a Systems Analyst with good commercial applications background. A knowledge of ICL 2903/4 systems together with some design and programming experience preferred.

WARRINGTON
RPG II ANALYST/PROGRAMMERS c £5800 + Benefits
Highly successful Company offering services to commerce and industry is seeking mature staff with good RPG II experience to cover business expansion. Excellent prospects with this dynamic Company.

NANTWICH c £5700
CORAL 66 PROGRAMMER
CORAL 66 programmer is required to work on dual Argus hardware with our client. Exceptional working environment with an innovative company.

BURY to £6500
SYSTEMS ANALYST
A Systems Analyst with sound manufacturing systems background to work on IBM hardware with a well established manufacturing company.

MANCHESTER to £5000
ASSEMBLER PROGRAMMER
Manchester based organisation is seeking a good IBM applications programmer to work on latest developments in a 370 CICS/VS environment.

PRESTON to £6000
SENIOR SYSTEMS ANALYSTS
Major company requires Analysts with 3 years commercial systems experience now ready to move to a senior position. Some programming knowledge is preferred but not essential.

STOCKPORT to £5100
COBOL PROGRAMMERS
Young COBOL programmers are being sought by one of the leading UK organisations. Excellent working conditions are available together with an opportunity to work on large systems and hardware.

NORTH CHESHIRE to £6000
SENIOR PROGRAMMER
Our client, a multi-site user committed to long term development, require a Senior Programmer with in-depth COBOL experience. Must be able to lead and motivate staff in a challenging environment.

LIVERPOOL c £6000
ANALYST/PROGRAMMER
A young Analyst/Programmer with an IBM OS background and TP experience is needed quickly. Opportunity to join major company with excellent prospects.

MANCHESTER to £5500
ANALYST/PROGRAMMER
If you have over 12 months COBOL experience our client will be pleased to hear from you. Friendly installation, commitrol OP user.

Phone **STEVE SYKES** on **LEEDS 444185** (daytime) or on **LEEDS 682417** (evenings or weekends), or write with brief details (no stamp required) to Lorien Computer Services, FREE POST, Leeds LS7 3YY.

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BCP

LEEDS
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★RELOCATION
★FLEXITIME

A major Group of Manufacturing Companies with a Group Turnover over £180 million are preparing for the development of several major systems in the Manufacturing Administrative and Management Information areas. They now require additional staff to support an extensive development schedule.

The client is looking for sound commercial experience possibly in a Manufacturing Environment and involvement in at least one major project from feasibility to implementation. Individuals with knowledge of Teleprocessing and Communications would be of particular interest, but the emphasis will be on proven expertise in Business Systems Analysis.

NORTH MANCHESTER
SENIOR ANALYST
★£5,529-£7,049
ANALYST
★£4,739-£5,977
OTHER BENEFITS

A large Multi-National Group have a requirement for Senior Analysts and Analysts to assist in their development programme.

A configuration enhancement is planned for the near future and the successful applicants will be involved in the associated developments.

A sound commercial background together with an ability to take on new work is required. Experience of Financial Applications and or production control is desired.

Applicants should be able to demonstrate ability to handle projects from design to implementation.

These positions offer the opportunity for career development along with the latest techniques.

Contact Dennis Hynes, Manchester (061) 236 4593.

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Systems Analyst

around £6,000

This appointment is with Holset Engineering Company Limited, a successful and expanding £30m. turnover company engaged in the design and manufacture of advanced original equipment for the worldwide automotive, marine and industrial markets. Strong financial and manufacturing systems play an important part in the control and development of the company.

The installation has an IBM 370/138 utilising DOS/VS in a DB/DC environment using CICS and DL/1 — later moving to IBM 8100.

The Systems Analyst, reporting to the DP Manager, will be involved in a loose project team environment with special emphasis on financial systems. The span of involvement is broad, the atmosphere friendly, and the experience should be invaluable. Training will be given as an integral part of the job. The post calls for some experience in financial systems, ideally gained in industry or commerce working in a similar installation.

Starting salary is around £6,000, attractive benefits include 33 days' holiday, excellent pension scheme and generous relocation help, where appropriate. Please telephone for an application form or write in sufficient detail to make this unnecessary, to: R Rozalski, Manager, Personnel Development, Holset Engineering Co. Ltd., Turnbridge, Huddersfield HD1 6RD. Tel: Huddersfield 22244

HOLSET

ANALYSTS

To £6.5k — LEEDS

The Burton Group is best known for its mens and ladieswear retail chains. The Credit Systems Team — which is part of the Management Services Division — provides the full systems requirement for the Group's Credit Company — Readycredit Ltd. Readycredit is already a market leader in the last expanding credit card business but is well placed — and ambitious — to develop and diversify its activities.

In fact, expansion is rapidly becoming the keyword of the Burton Group for, as well as having a wide range of challenging projects to work on, the successful applicants will be supported by new hardware which is currently being installed — twin 2960s which will operate under DME with MOPS and VDUs.

We are looking for: —

1 SENIOR ANALYST — who should have several years of relevant commercial experience.

1 ANALYST — who could be fairly new to Systems but with a sound Programming background.

In addition to an attractive salary structure, we offer a competitive total remuneration package. Annual review date is September 1st and the bonus a substantial one — for a job well done. The package also involves paid overtime, retail discounts and if appropriate, full relocation expenses.

Telephone Tim Mackereth on Leeds (0532) 36373, Ext 538, or write to him at the Burton Group Limited, Hudson Road, Leeds, LS9 7DN, West Yorkshire.

BURTON

BASIC RSTS OPPORTUNITY

SYSTIME is the most successful British company in the field of mini computer based business systems. Our remarkable success in the last six years has been achieved using two important elements. One, a top range of products supported by first class back-up facilities and Two, by employing the most experienced and ambitious people in the business.

The inherent enthusiasm and team spirit within the company has enabled us to develop a highly efficient and profitable organisation in which individual talent and drive can earn just rewards.

Opportunities exist in:

LEEDS for SOFTWARE CONSULTANTS ANALYSTS/PROGRAMMERS PROGRAMMERS

To join a small team of enthusiasts, responsible for the design and implementation of new Software packages for commercial systems.

Experience of Production Control is essential and for senior positions proven ability to plan and control projects from inception to acceptance is required. Knowledge of PDP 11 Hardware, RSTS and BASIC + would be an advantage. Some travel is necessary and company car or allowances will be provided as appropriate.

Programmers require at least one year experience of commercial applications, preferably with knowledge of BASIC +, RSTS or RSX 11.

If you wish to develop and extend your ability to the full, Systime is the company to work for. Real opportunities exist for you to increase your responsibility and income.

We offer attractive salaries, company bonus scheme, comprehensive benefits package including relocation if required.

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Programmers & Analysts £4000-£6000

depending on experience

Our client is a well known manufacturer in beautiful South Cheshire, convenient for motorway access.

Their well-established 370 IMS/VS installation is already extremely sophisticated, with heavy use of database and on-line techniques, including program development. System implementation is continuing apace, leading to the vacancies described.

There can be few better environments for talented and ambitious DP professionals, so the sooner you apply, the better.

RURAL CHESHIRE

PROGRAMMERS

★ Minimum of 18 months solid programming experience on any machine.

★ Ideally PL/1, but Cobol very acceptable.

ANALYSTS

★ Must have taken a significant system from start to finish.

★ Production applications preferred.

Salaries are attractive, and a productivity bonus is also paid. Assistance with relocation will be offered, where necessary.

TRAINING

Suitably experienced persons would be trained in any additional discipline needed for the task.

TO FIND OUT MORE, TELEPHONE (TRANSFER CHARGES IF NECESSARY) OR WRITE (NO STAMP REQUIRED) TO ARNOLD SAMPSON.

Initial interviews will be held in Manchester or London.

Sampson Staff FREEPOST, Manchester M1 8DL. Tel:- Office: 061-832 4184 Home: Tottington (020488) 2545.

TYNE AND WEAR TRANSPORT

VACANCY

SYSTEMS ANALYST/ PROGRAMMER

Salary range £5,736-£6,452

Applications are invited for this newly created post within the Finance Department of this Executive from suitably qualified and experienced persons.

The successful candidate will be responsible to the Administrative Services Officer for advising the Executive in data processing matters and for assisting other Managers in the preparation of feasibility studies of systems under consideration for computerisation.

The duties of the post will include the determination of information requirements; evaluation of existing systems and their suitability for computerisation; the regular review of existing operational systems; supervision of the operation of 7503 Remote Job Entry device, assistance in the selection and training of D.P. staff; liaison with Tyne and Wear County Council D.P. Staff in all matters of mutual interest; and participation in an in-house Steering Group.

The appointee will also play an important role in the development of integrated computerised systems for Metro operations.

Conditions of service are those laid down by the Joint Negotiating Committee for Non-Manual Employees of Passenger Transport Executives and appointment is subject to meeting the medical requirements of the Executive's Medical Officer.

Applications stating age, qualifications and the names and addresses of two referees to be addressed to:

Associate Director (Personnel)
Tyne and Wear Transport
Manors
Newcastle upon Tyne NE1 2EL
to arrive no later than Friday, 1st June, 1979

NORTHERN REGIONAL HEALTH AUTHORITY

SENIOR SYSTEMS DESIGNER

(SCALE 14)

Applications are invited for the post of Senior Systems Designer in the Regional Statistical and Operational Research Section. This is a senior post in a team of three which is concerned both with providing computing support for the work of the section and undertaking specific project works.

An ICL 2960 operating under DME will shortly become operational.

Applicants should preferably be of graduate or equivalent status in a numerate science with demonstrable statistical and/or computing experience.

Salary scale £5537-£6715 p.a. (increase pending). New entrants to the NHS will normally commence on the minimum point.

Potential applicants who wish to discuss the post can do so if desired with Mr. R. A. McNey, The Regional Statistician, on (0632)-654188, Ext. 3195.

Application form and job description available from the Regional Personnel Officer, Northern Regional Health Authority, Benfield Road, Walkergate, Newcastle-upon-Tyne NE6 4PY.

—Closing date 11th June, 1979.

WEST YORKSHIRE

ANALYSTS AND PROGRAMMERS

required for Software House specialising in small business systems across a varying hardware spectrum.

Experience: COBOL, R.P.G.II or BASIC (at least one year).

Salary: Negotiable, in relation to experience and ability.

Please telephone (avoid 25th and 28th May), Halifax (0422) 650 88 or 88881.

For further details of these appointments — or write: Gerry Yates, Managing Director, Calderdale Computer Co. Ltd., Bull Green House, Halifax, West Yorkshire HX1 2EB.

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Contact
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on
061-834 5105 (24 hours)

OR SEND YOUR CV TO:
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FREEPOST
MANCHESTER M23 B4

IPP Information Processing People (North)

Suite 59, 60 Royal Exchange Buildings, Cross Street, Manchester. Telephone 061-834 5105 (P&S) 24 hrs. Telex 261298

CITY OF SHEFFIELD POLYTECHNIC

Department of Computer Services

SENIOR SYSTEMS PROGRAMMER

Post No 268
AP5 — £4773-£5073 (including supplement)

Will be responsible for the installation, maintenance and development of systems software on the IBM 370/135 computer and responsible to the Systems Project Leader. Applicants should have previous experience of IBM Assembler language programming, the IBM OS/VS1 operating system and of IBM equipment.

Requests for an application form in writing only please to the Recruitment Section of the Personnel Department, Sheffield City Polytechnic, Halfords House, Fitzalan Square, Sheffield S1 2BB. Completed forms should be returned by 8th June.

THE UNIVERSITY OF LEEDS

SYSTEMS ANALYST

Salary up to £7145

A systems analyst is required to join a small team of analysts and programmers in the Administrative Computer Unit, which is actively preparing for on-line systems to be implemented after delivery of an ICL 2904/50, and which is currently maintaining an interesting range of batched systems on an ICL 1901T.

A sound knowledge of COBOL and a good background in ICL hardware and software is necessary together with some on-line experience.

Further details can be obtained from Mr. M. M. Smith, Senior Assistant Registrar (Data Processing Services), The University of Leeds, Leeds LS2 9JT.

Written applications should be sent to the Registrar, The University of Leeds, Leeds LS2 9JT, quoting reference number 119/19, by not later than 1 June, 1979.

Cyngor Sir DYFED County Council

Applications are invited for the following post:

COUNTY TREASURER'S DEPARTMENT

SENIOR COMPUTER PROGRAMMER

(CTD 113) — CARMARTHEN

Grade: AP5 £4773-£5073 inclusive of supplement

Applicants for this post should have appropriate training and experience.

A proven record of achievement as a COBOL programmer is essential; a working knowledge of another language and of the George 3 Operating System will be an advantage.

The Council has an ICL 1904S computer, with communications links to its District Councils and to various schools.

Application forms, returnable by 31st May, 1979, are available on receipt of a stamped addressed envelope from the Director of Personnel and Management Services, County Hall, Carmarthen.

CANVASSING DIRECTLY OR INDIRECTLY WILL DISQUALIFY.

THE UNIVERSITY OF LEEDS

DEPARTMENT OF LINGUISTICS AND PHONETICS

Applications are invited from suitably qualified candidates for the post of COMPUTING ASSISTANT in the above Department. The main part of the work will involve developing machine language programs for a PET microcomputer interfaced to various laboratory instruments used in speech analysis and synthesis, though computing work in other areas of linguistic research may also be required. The appointment will be made with effect from 1 October 1979 for a fixed period of one year. Salary at an appropriate point on the 1B scale for Other Related Staff (£3775-£6355) (under review), according to age, qualifications and experience.

Application forms and further particulars may be obtained from the Registrar, The University, Leeds LS2 9JT, quoting reference number 14/3/AZ. Closing date for applications 18 June 1979.

UNIVERSITY OF BRADFORD

Computing Laboratory — Computer Officer Posts

Applications are invited from graduates or professionally qualified persons for two posts in the University's Computing Laboratory which operates a large ICL 1904S installation running under the George 3 Operating System and providing a central service for research and teaching within the University.

COMPUTER OFFICERS

(Ref. CL/CO/C)

Are required in the Systems/Communications and Application groups. Both posts require programming experience and knowledge of the GEORGE 3 Operating System would be an advantage. Salary on scale £4232 to £7145 p.a. Application forms and further particulars are available from the Personnel Office, University of Bradford, West Yorkshire BD7 1DP.

Programmers

LEEDS — based at Limewood Approach, Leeds 14. £3860/£5210 per annum plus a self-financing productivity payment.

Applications are invited from programmers with at least one year's experience ideally in Cobol.

The successful applicants will join a programming department (about 27 strong) which has an impressive record of producing quality software on time using on-line programming facilities. The work is demanding and stimulating with a wide range of applications under development.

The Board's computer installation comprises a dual ICL System 4.70/4.72 with an extensive communications network and a dual ICL 2972 configuration is scheduled for delivery in early 1980.

Conditions of service are excellent and include:

★ 4-5 weeks' holiday
★ flexible working hours
★ contributory pension scheme
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★ subsidised restaurant

Applications, quoting the vacancy number 58/79, should be forwarded to the Secretary, Yorkshire Electricity Board, Scarcroft, Leeds LS14 3HS, to arrive not later than 30 May 1979.

Yorkshire Electricity Board

Opportunities for Systems Analysis & Programmers

West Yorkshire

RHP, Britain's largest manufacturer of Ball and Roller Bearings, have an established Computer Bureau at Ferrybridge servicing manufacturing locations in the North of England.

Data Processing systems play a vital part in the control of the day to day operation of the Company in the areas of sales, manufacturing and accounting. Systems are run on an ICL 2904 Computer in COBOL with a growing communications network. It is our intention to extend communications to the other factory units.

We are looking for young, enthusiastic men or women to fill the following positions:

Systems analyst

With background in both computer and O & M systems to become involved in general information flow. A knowledge of database concepts would prove useful.

Programmer

To work as a member of a project team programming in COBOL. Experience of ICL Software and equipment would be desirable.

Attractive salaries, good career prospects and the usual fringe benefits associated with a large International company are offered. Assistance will be given with relocation expenses.

Please write for application form or telephone:

The Personnel and Training Manager.
RHP Transmission Bearings Division
PO Box 9, KNOTTINGLEY
West Yorkshire WF11 8LS
Tel: Knottingley (0977) 84121.

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For more information about the vacancies currently available you should contact:

Gerald Plimbley
Office: 061-941 1922. Home: 0270 78684

Computing Services Association

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Are you a Senior Programmer? Could you take charge of a conversion? Our client, a large multi national combine in a wide variety of consumer goods, has recently up-graded from Honeywell 20/40 to Level 66.

It is felt that you will have about 3 years experience, ideally in Honeywell COBOL, but other hardware would be considered. For this position our client will pay generously, plus all out of pocket expenses whilst away from your home base.

Initially you will be employed at York for about 9 months, at the site of one of the group companies. Your first assignment will be to convert all existing systems, once this is completed you will take up permanent employment at their Manchester location.

This is an unusual and exciting opportunity, applications are invited from applicants who wish to form a career path within a large company. Benefits include, discount on all group products, free dental care, medical centre, canteen and social club.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW 140-9MB

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Computing Services Association

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In the Northern, Scottish and Ireland areas, including area features space reservations should be made to Owen Kelly Manchester (061) 872-4211

Other features will appear on the following dates:
IRISH RECRUITMENT FEATURE JULY 16th
NORTHERN RECRUITMENT FEATURE SEPTEMBER 27th
SCOTTISH RECRUITMENT FEATURE OCTOBER 25th

Programmers/Analysts

We are the British Mail Order Corporation, Europe's largest and most successful Mail Order company and due to a rapid expansion in business we now have vacancies in our computer section for the following positions.

Programmer

For this position we require a young, energetic person educated to 'A' level standard with at least 18 months COBOL programming experience and preferably some knowledge of Assembler/PL1, (although this isn't essential as training will be given).

The work is interesting and varied and the successful applicant will become a member of a lively, young Project Team involved in all aspects of programming work including updating existing financial and accounting procedures and developing new programmes and systems.

Senior Programmer/Analyst

The successful candidate will be required to report to, and at times deputize for the Project Leader in a wide variety of work including investigation and development of new and existing systems as well as writing, testing and implementing programs relating to our Agency and Marketing Operations. Ideally we want a responsible and self-motivated man or woman educated to 'A' level standard with at least 2 years Assembler Programming experience.

A knowledge of COBOL would also be an advantage and you should be able to communicate clearly, both orally and in writing with an ability to apply computer terminology to practical situations.

For each of the above positions we can offer excellent promotion prospects plus a competitive salary, commensurate with experience, good working conditions and attractive fringe benefits including staff discount on Catalogue Merchandise.

Please write with full details of salary and career to date to:—
Miss L. M. Murray, Personnel Officer,
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G U S

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£7500 + + CAR AND BENEFITS

Ward & Goldstone Limited, an electrical manufacturing group based in the North-West, with a current annual turnover of £60 million, and 6,000 employees, have embarked on a policy of further divisionalisation.

In line with this, some excellent opportunities are being created for experienced D/P personnel.

In future each division will be responsible for its own computer systems development, including programming, and managers are now being sought to lead these divisional teams.

Applicants should have:—
- ★ At least 7 years' data processing experience, mainly in systems/business analysis.
- ★ A good all-round systems background, though some manufacturing experience would be advantageous.
- ★ The proven ability to manage projects from feasibility study through to implementation
- ★ Supervisory experience of analysts/programmers.
- ★ A knowledge of IBM 370 hardware and software.

We are seeking to fill four such positions all in the Lancashire area, and conveniently located for the motoway network, at:—

HINDLEY GREEN, NEAR WIGAN LEIGH SALFORD (2)

Please reply, giving full details, and stating the preferred location if any to:—
GROUP PERSONNEL MANAGER
WARD & GOLDSTONE LIMITED
FREDERICK ROAD
SALFORD M6 6AP

or telephone RUSS GIBSON ON 061-736 5822 for further information.

UNIVERSITY OF SALFORD

PROGRAMMER £2823-£4632

ICL 2903 32K, EOS 60S

We require a COBOL Programmer to join a small team of Analysts and Programmers working on the development, implementation and maintenance of commercial-type applications including financial accounting, job costing, management reporting, personnel and student records, and on-line file enquiries and updates.

Starting salary according to qualifications and experience.

Letters of application stating age, experience, qualifications and present salary, should be sent to the Registrar, University of Salford, Salford M5 4WT by 1 June 1979, quoting reference A/831.

UNIVERSITY OF BRADFORD

Computing Laboratory — Computer Officer Posts

Applications are invited from graduates or professionally qualified persons for two posts in the University's Computing Laboratory which operates a large ICL 1904S installation running under the George 3 Operating System and providing a central service for research and teaching within the University.

COMPUTER OFFICERS

(Ref. CL/CO/C)
Are required in the Systems/Communications and experience and knowledge of the GEORGE 3 Operating System would be an advantage. Salary on scale £4232 to £7145 p.a. Application forms and further particulars are available from the Personnel Officer, University of Bradford, West Yorkshire BD7 1DP.

LEEDS CITY COUNCIL
DEPARTMENT OF ADMINISTRATION

COMPUTER SERVICES

The Council currently operates a large ICL 1904S with a variety of computer terminals (including mini-computers) and a wide range of computer applications running under the GEORGE 3 operating system. Consideration is being given to the replacement of the ICL 1904S and evaluation of alternative equipment is expected to commence shortly. The following vacancies exist in the Development Branch, which is organised into several project teams.

ANALYST PROGRAMMER

SO1/2 - £5232 to £6060 p.a. (inclusive)

Applicants should have at least three years' COBOL programming experience and preferably some knowledge of PLAN or other 1900 software. Experience of programming, staff supervision and training is also desirable. This post will subsequently provide an opportunity to obtain systems analysis experience within a project team of ten staff.

PROGRAMMERS — SOFTWARE AND APPLICATIONS

T1/5 — UP TO £5073 p.a. (inclusive)

Applicants should have experience of COBOL, PLAN, FIND 2, GEORGE 3 or Communications Manager. One programmer is required for the Software Team and four are required for the Application project teams. Commencing salaries will be dependent upon experience and ability, generally as follows:
a) 6 months' programming experience £3279 p.a.
b) 12 months' programming experience £3732 p.a.
c) 18/21 months' programming experience £4245 p.a.
d) 27/30 months' programming experience £4773 p.a.

Applications in writing to: Mr. I. B. Graham, Personnel Officer, Department of Administration, Room ..., Civic Hall, Leeds LS1 1UR.
Closing date 4th June, 1979.

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Do you have personality?
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IMPLEMENTORS
to prepare developed Systems for live-running by designing the operational system and creating the JCL — Experience on IBM equipment under OS or VS is essential

PROGRAMMERS
to program new systems using structured programming techniques as a member of a project team — Experience of COBOL is required

For all posts CORNING require sound D.P. experience. Although they would like you to walk straight in and be at home they will train the right people to their standards. Highly competitive salaries will be backed by excellent career prospects with the possibility of international travel. Re-location expenses will be met and the North East is an area of splendid countryside, magnificent coastline and reasonably priced housing.

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Ford offers a unique combination – the exposure to manufacturing applications you'd only get 'st the sharp end' in industry and the variety of hardware and software you'd expect only in a bureau.

Our computer function is constantly expanding and to help us maintain and develop no fewer than five major projects starting in the next year, we now need more experienced Programmers and Analysts.

The projects involve on-line applications using CICS and/or DL/1. You will be using such equipment as an IBM 370/138 with 512K running under DOS/VS and Power/VS and an additional machine due to be installed this year. All the programme updating is done on on-line VDU's using SPMOL and there are communication links to Antwerp in Belgium, Troy, USA and Cologne in Germany used for data transfer and transplanting of systems.

As an Analyst/Programmer you should have at least two years COBOL Programming or Analysis experience preferably gained in a manufacturing environment using CICS. The Software Programmers should ideally have experience on an IBM Mainframe in a DOS/VS environment and be experienced on CICS and DL/I.

Any supplementary training necessary will be provided by us.

We offer a salary of up to £6,700 p.a. including Supplement, a full range of fringe benefits which include Ford's Special Car Purchase Plan and relocation assistence where appropriate.

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ASST. DATA PROCESSING MANAGER . . TO £7000

An opportunity has arisen for a person to gain veluable experience in the management of e DP dept. We are one of the leading suppliers of leisure clothing and equipment in the UK and we have subsidiaries in Holland, West Germeny and Sweden.

Themein responsibilities will be to run the UK dept. end assist the DPM with luture development in the UK end abroad. Current equipment includes IBM System 3, 34 end 32 with e 3B to be delivered in Merch 1980. Cendidetes will have e thorough knowledge of programming end systems work on the above equipment end an in-depth knowledge of RPG is essential. On-line experience will be e distinct advenlege.

In addition to a competitive selery, benefits include profit shering bonus, steff discounts, end medical end persoonel eccident insurence.

For further detalls please contect Miss D. B. Moore, Personnel Officer on 450 86B1, or write to: Camperi International Limited, Camperi House, Priestley Way, Steples Corner, London NW22 7AZ.

Northempton Borough Council
Finence Department

Senior Systems Analyst

SO1/2 — £5232-£6060 p.a. (inclusive of supplement)

Applicants for this challenging end interesting post should heve approximately 3 yeers' experience in Systems Analysis and be capeble of undertaking new projects from beginning to end.

The Council operates an ICL 64K 1902T Computer with disc end tape backing, on-line video and cash receipting terminals end key-edit magnetic tape input. The communications network is in process of expansion.

Starting salery will be commensurate with quelifications and experience.

Temporery lodging or travelling expenses; disturbance allowance; assistance with removal expenses and estate agents'/solicitors' fees in approved cases. Housing accommodation may be available.

Application forms are available from the Chief Executive and Town Clerk (Personnel), Northampton Borough Council, 61 Derngate, Northampton NN1 1UW. Telephone Northampton (0604) 34661, Ext. 663.

Completed forms to be returned by not later than June 11th, 1979.

Computer Professionals

Recent delivery of an ICL 2960 on-line computer gives an exciting opportunity for a major technological step by this large, go-ahead Authority. Trained staff urgently needed to participate in long term planning programs, systems design and ancillary support services to achieve the full potential of this sophisticated master tool to help guide the Borough's resources towards the century. There are vacancies for:

(a) **Software and Communications Officer**
Salary up to £6,663 p.a.

(b) **Two Systems Analyst/Programmers**
Salary up to £6,126 p.a.

(c) **Junior Systems Analyst/Programmer**
Salary up to £5,349 p.a.

Post (a) entails monitoring and controlling the effectiveness of communications software and hardware (including terminal and ancillary equipment), and providing comprehensive support to users. Applicants should have a minimum of five years' related experience. Posts (b) are part of multi-disciplina team involving a wide range of vital applications, and at least two years' experience in systems analysis or Cobol programming are required. A computer-related degree or other appropriate qualifications would be an advantage. Candidates for post (c) should have some basic practical experience and be able to demonstrate aptitude and adaptability. All four posts carry first-class career potential.

Separation allowance payable for up to six months if longer; 100% removal expenses; interest-free loans for season tickets; extra leave at Bank Holidays; flexible working hours; good canteen facilities.

Application forms obtained from Borough Treasurer's Department, Room 40, Town Hall, Hendon, London NW4 4BG, telephone number 01-202 8282, ext. 213, quoting date 11th June, 1979.

LONDON BOROUGH OF BARNET

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£7,500 **ICL SYSTEM 10**

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Operations Director
Holt-Saunders Ltd., 1 St. Anne's Road Eastbourne BN21 3UN

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College Area, The High
Harlow (Tel. Harlow 20131)
DEPARTMENT OF MATHEMATICS AND OCIENCE

LECTURER GRADE I in MATHEMATICS and COMPUTING

Applications are invited from suitably qualified candidates for the above post, tenable from September 1979. The lecturer is required to teach mathematics for OCE 'O' level and TEC in Engineering courses, together with computing for the City and Guilds 747 Certificate. Recent experience in the field of computing is desirable.
Salary scale: £3,192-£6,334 (plus £15/£30 London fringe)
Application forms and further details obtainable from the Principal.

REDIFON PROGRAMMERS

A software company wishes to compile a list of currently active freelance programmers in Southern England.

Reply in confidence to: Box 1022, Computer Weekly.

ANALYST PROGRAMMERS

£6000 + CAR

We require persons with 2-3 years' experience of Systems Analysis and a sound knowledge of RPG2.

The successful applicants will be expected to play a major role in the implementation of customers IBM S/32, S/34 & S/3B Computers.

The duties involve providing support to established customers, some of whom will be linked to our S/34. Design; Programming and Implementation of on-line systems.

User Contact and Travel, possibly to Europe, make these posts of considerable interest to those individuals who enjoy variety and commitment.

For more details contact: Jeff Sears, Orwell Data Services Ltd., 84 Fore Street, Ipswich. Tel. 0473 58523/22174.

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Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611 MANAGEMENT & EXECUTIVE SELECTION

UNIVERSITY OF LONDON COMPUTER CENTRE

The University of London Computer Centre provides a regional computer service to the University of London and to Universities in the South-East and South-West of England. The Centre is equipped with Control Data 7600, 6500, 6400 and CYBER 72 computers and supports a large communications network of over 50 remote batch terminals and 30 keyboard terminals.

An exciting programme of development is planned which will include substantial replacement of the existing equipment in the early 1980s.

Applications are invited for the following posts:

OPERATING SYSTEMS GROUP

Senior Analyst/Programmer

New Systems Evaluation

Two Senior Analyst/Programmers are required to assist in the evaluation of computer systems which are under consideration as part of the Centre's development plan. The successful applicants will join a small section which is currently involved in design and evaluation and will become the software installation team for the new systems.

The work will include a significant development content in a multiple system environment.

Candidates for these posts should have several years of experience in operating systems development or support. Experience with computer selection or with multiple computer systems would be an advantage.

Analyst/Programmer

Systems Integration

Two Analyst/Programmers are required to work on integration, testing and reliability monitoring of the Centre's operating systems. This is a specialist field within the Operating Systems Group and offers an excellent opportunity for young graduates with an interest in operating systems to gain experience. Candidates should have a good knowledge of high level and some knowledge of machine level programming. Experience with Control Data equipment is not essential.

USER SUPPORT GROUP

Analyst/Programmer

Compilers and Graphics

An Analyst/Programmer is required to work in the User Support Group with particular interest in the implementation, maintenance and support of com[pi]lers and graphics software. Candidates for the post prefera[bly] should possess a qualification in Computer Science, or have [e]quivalent experience, with high level of fluency in FORTRAN. Experience of Control Data Equipment is not essential.

Analyst/Programmer

Advisory and Documentation

Applications are invited for an Analyst/Programmer in the User Support Group to make up the team of full-time Advisers at the Centre.

Applicants must have knowledge of FORTRAN and be able to communicate with users. Experience of the ULCC system would be an advantage.

Salaries will be commensurate with age and experience on scales £3888-£8452 plus £502 per annum London Allowance.

The Centre offers excellent conditions of ser[vice] and operates the Universities Superannuation Scheme.

Further details and application forms are available from: Miss H. M. Gubby, ULCC, 20 Guilford Street, London WC1N 1DZ. Telephone: 01-405 8400.

Applications close two weeks after the appearance of this advertisement

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THE OPEN UNIVERSITY

1969 10 1979 — TENTH ANNIVERSARY

RESEARCH PROGRAMMER — CYCLOPS

The Open University is collaborating in the development of an advanced microprocessor terminal system for use in business and training applications. There is a vacancy in the project team for a Programmer to work on both microprocessor and mainframe software connected with the project. The post is for 2 years.

Applicants should have experience in one or more of the following areas: DEC/PDP systems, PASCAL, microprocessors, or graphics.

The programmer will work at the University's headquarters in Milton Keynes. The University offers attractive working conditions including six weeks annual holiday and assistance with relocation to the area.

Salary will be at an appropriate point on the scale £4,232-£7,145 p.a.

Applicants may telephone Milton Keynes 63424 for information about the post.

Application forms and further particulars are available from The Recruitment Office (MB3775/1), The Open University, P.O. Box 75, Walton Hall, Milton Keynes, MK7 6AL or telephone Milton Keynes 63405: there is a 24 hour answering service on 63068.

Closing date for applications: 7th June.

Operations Staff

. . . your career takes off here in Reading Up to £5804

We're at the forefront of computer technology, we're successful and we're growing fast. This continuing expansion means that part of our Product Development Group based in Reading needs to take on more experienced computer operations staff. It also means that for the right people the career progression we can offer, in Reading and throughout the ICL Group, will be second to none. Check the details below to see where you could fit in.

Team Leaders – up to £5804
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Using ICL 1904S, 2903, 2904 and System Ten you will:
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We need to take on people with experience of the following:
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- E6RM exec. – ops. exec. on a 1900
- E3RM exec. – ops. exec. on 2903

We operate an attractive shift system for Saturday nights and you will be able to enjoy our full range of large company benefits like our generous relocation package if you need to move.

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Ring Phil Wilcox on Reading (0734) 595711 ext. 240 or Charlayne Dale on ext. 271 or write for an application form, quoting reference CW1397, to ICL Personnel Dept., Portman Road, Reading RG3 1NR.

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We are particularly interested in those who have a proven record of accomplishment in one or more of the following areas:

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—LARGE SCALE INFORMATION SYSTEMS
—MINI-COMPUTER SYSTEMS
—PROGRAMMING
—DATA BASE MANAGEMENT SYSTEMS
—COMPUTER COMMUNICATIONS

For more information, submit your Curriculum Vitae in confidence to the address below by June 8. Our representatives will be in London to conduct interviews starting June 18. Qualified candidates will be contacted by telephone to arrange interview appointments.

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Education to a degree level or equivalent ... for the senior position, together with ... puting experience in a commercial or ... vironment.

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Barclaycard, Northampton NN1 ...
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Senior Systems Analysts

- Commercial orientation with 7-8 years experience of which the last 4 should have been spent in design work.
- On-line and programming experience
- Successful record of systems implementation
- Preferably University Degree or Accounting Qualification
- Data base experience, in particular IDMS, would be useful.

Applications Programmers

We are seeking programmers with 3-7 years experience developing on-line systems.

We are particularly interested in two backgrounds:

- mainframe experience especially with large ICL 2900 under VME/B or VME/K
- minicomputer experience especially with DEC PDP/11 under RSTS or RSX

These posts offer an exceptional opportunity to join one of Logica's most rapidly expanding divisions at an early stage of development. Long term advancement and career prospects are excellent.

Please call Julia Roth on 01-637 9111 or write, quoting reference MEO/8 to

logica FREEPOST 21 London W1E 4JZ

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SENIOR DESIGNERS ★ PROJECT LEADERS

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The teams will be based WEST of LONDON in RURAL BERKSHIRE. The working environment at the Self-contained Research and Development centre is exceptionally good, and there is a very generous RELOCATION PACKAGE available to all candidates together with the usual large company benefits.

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★ SIMULATION
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IPP **Information Processing People**
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£20,000 - £23,000 pa

The Howard Organisation has an immediate requirement for the following computer professionals

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At least two years experience of RSX-11M and good, sound, all-round systems knowledge preferable in Comms. Working knowledge of French, German or Dutch would be an advantage.
Ref. GWK 1105/9

Systems Designer

Practical experience encompassing project planning and team set-up, training team and users on medium size DP systems, preferably in the financial sector. Knowledge of third generation general purpose machines, corresponding software packages and tele-processing applications. Language: PL/1, COBOL.

Experience in system design related to book keeping, production control, system conversion in banking and public administration applications would be an advantage. It is essential that any applicant is fluent in English, French with Dutch recommended.
Ref. GWK 1205/9

The above vacancies are all based in continental Europe and can, for the right person, represent long term involvement.

Apply in the first instance to Norma Baxter at 01-953-4066 quoting reference number.

Advance - and be recognised

Howard Organisation International Ltd., Employment Business Section, 5 Elstree Way, Borehamwood, Herts.

HOWARD

University of Wales

UNIVERSITY COLLEGE OF SWANSEA

Full-Time / Part-Time Programmer

Applications are invited for the vacancy of Full-time/Part-time Programmer in the Department of Civil Engineering to provide programming support on its S.R.C. Interactive Computing Facility. The system is based round a PDP 11/40 running under the RSX11M operating system. Duties will be mainly concerned with providing a program advisory service for research workers, together with some applications programming. Applicants should preferably have a degree or equivalent qualifications in computer science, engineering or mathematics, with a good knowledge of FORTRAN. Participation in DEC training course may be arranged.

The appointment will be for up to three years in the first instance, from the soonest date that can be arranged. The salary will be on a scale £3,669-£6,108 per annum or pro rata for Part-time plus USS/USDPS benefits, the commencing salary depending on age and experience.

Further particulars and application forms (2 copies) may be obtained from the Personnel Officer, University College of Swansea, Singleton Park, Swansea, SA2 8PP, to whom they should be returned by FRIDAY, JUNE 8, 1979.

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So call us for good advice, and we will match YOUR SKILLS with the RIGHT JOB. Below are just a few of the jobs currently available — if none of them suit your experience, contact us and tell us what you want.
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Shift Leader—Middx.—min. 5 years + VME/B UP TO £8 K incl.

360/370 Operators—City—1 year OS or DOS up to £4½ K incl.

Burroughs 3800—Croydon—1 yr. any medium sized mainframe . . . . up to £6 K incl.

ICL ops—E.7 & Middx.—6 mnths + GII or GIII up to £5 K incl.

Contact PATSY BARNES at CROYDON for further information

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below, QUOTE REF.

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UNIVERSITY OF NOTTINGHAM
CRIPPS COMPUTING CENTRE

SENIOR SYSTEMS PROGRAMMER (TELECOMMUNICATIONS)

The University has a linked ICL 1906A/1904S configuration running under George 3 and offering batch, online and remote job entry facilities. The system supports a fully integrated packet switched network comprising, two PDP11/40's (providing visual editing and data preparation), a CTL Modular One (providing interactive BASIC), a Faculty PDP11/34 (providing online access, data capture and file transfer facilities to remote users), and a PDP11/34 switching node (providing access to EPSS and additional interactive facilities, and later to departmental mini computers). The centre is also actively participating in the development of a new X25 regional network (MIDNET), which will fully interconnect the main computing services of the six Midland Universities.
The person appointed will join the Centre's communications team engaged in developing and enhancing the above facilities.
Experience of either PDP11's or George 3 is essential.
Applicants should normally have a degree or equivalent experience.
Salary will be in a range up to £7,145, according to qualifications and experience.
Further particulars and forms of application, returnable not later than 8th June 1979, from the Staff Appointments Officer, University of Nottingham, University Park, Nottingham NG7 2RD. Ref 893.

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required at BENTALLS, the KINGSTON-based group of stores.

Working on our Criterion 8450, the successful applicant will have at least six months' operating experience, preferably under B 3.

Some evening shift work and occasional overtime will be involved.

Salary £3,750 excluding any shift allowance.

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Group Personnel Controller
BENTALLS LTD.
Kingston-upon-Thames, Surrey KT1 1TX

Bentalls

DEPARTMENT OF MECHANICAL SCIENCES

Lecturer Grade II/ Senior Lecturer in Computing

(Data Processing and Systems Analysis)

Applications are invited from men or women, suitably experienced and qualified in the fields of data processing, commercial systems analysis and design.
Salary within the range £4101-£7065 (Bar)-£7572 p.a.
Application form and further details from the Assistant Director and Chief Administrative Officer, Trent Polytechnic, Burton Street, Nottingham. Forms to be returned as soon as possible.

TRENT POLYTECHNIC NOTTINGHAM

BARNET (London Borough of)
HENDON COLLEGE OF FURTHER EDUCATION

Required for September, 1979

DEPARTMENT OF SCIENCE AND TECHNOLOGY
Post No. 16/79

LECTURER I
in Computer Studies

A graduate with teacher training or teaching experience expected. Courses include G.C.E. 'A', City and Guilds, B.E.C., I.A.S. Ability to teach mathematics or statistics would be helpful. Closing date for the above post will be 12th June, 1979.
Application forms and further particulars may be obtained by sending a large stamped, self-addressed envelope to the Principal, Hendon College of Further Education, Williams Buildings, The Burroughs, Hendon, London NW4 4BT.

SYSTEM 3 OPERATOR

Wine and spirit shippers situated in NW10 are seeking an experienced operator for their IBM System 3 Model 15 computer, which will shortly be upgraded to Model 15D.
The successful applicant will ideally have gained CCP experience controlling remote end local terminals and communicating IBM 3741 punches.
Single shift work 9.15 a.m. to 5.15 p.m., Mon./Fri.
The System Operator will possess initiative and be prepared to assist in the other functions of the D.P.D.
Holiday arrangements will be honoured.
Salary £5,00-£6,000.
Contact: Mr. Kardos 01-459 8011.

Programmers
£5,500-£6,000 p.a.

Help develop our world-wide Database system

If you have COBOL as your programming language together with knowledge of OS.JCL and ideally some experience of IDMS then you can contribute to your future and ours.

Working in a team of 3-5 people your abilities will be recognised and well rewarded.

If this is your kind of future then telephone or write to Maureen Peachey on 01-903 8484 ext 3153 at Pullman Kellogg Ltd., The Pullman Kellogg Building, Stadium Way, Wembley HA9 0EE.

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We require an experienced data controller to supervise our operations support area.

At present the installation comprises an I.B.M. 370/148 and upgrading to an I.B.M. 30/31 is in the planning stage.

Applicants must have experience of general data control techniques preferably with knowledge of the O.S./V.S. operating system. A supervisory background would also be a distinct advantage.

The position carries an attractive starting salary, plus productivity bonus; together with excellent general conditions of employment including 23 days annual holiday, subsequent to a qualifying period, and a contributory pension scheme. Additional benefits include free life assurance. Company Products, an active Sports and Social Club and subsidised canteen.

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Senior Operators	370/138 OS/VS1	Commercial	Avon	c £5000 + reloc	Ref. B3177A
Ops/Sen. Operators	370/138 OS/VS1	Financial	Devon	£ neg. + reloc	Ref. B3222A
Operations Manager	ICL 1905S Geo III	Research	S. Wales	c £5500 + reloc	Ref. L3202
Senior Operator	ICL 2980 DME	Financial	Devon	£ neg + reloc	Ref. L3222
Computer Operator	ICL 2904 JCL	Travel	Avon	£3000+free travel	Ref. L3162
Computer Operator	DEC PDP 8 RST3	Engineering	Dorset	c £4500 + reloc	Ref. L3178
Terminal Operator	ICL 2903/Honeywell 2020	Local Gvt.	Glos	c £4500	Ref. N3161
Trainee Operator	ICL 1902T Geo II+	Printing	Avon	£2500	Ref. N3221
SYSTEMS					
Programmer 2 yrs+	ICL 2900/COBOL	Commercial	S. Devon	£5000	Ref. L3175
Project Leader	ICL 1900/PLAN	Commercial	S. Wales	c £5300	Ref. L3223
Analyst Programmer	2 yrs COBOL/RPG	Engineering	Somerset	c £5000	Ref. L3187
Programmers	ICL 1902/COBOL	Commercial	Avon	c £5600	Ref. L3184
Programmers	IBM 370/COBOL	Engineering	Avon	c £5000 + Accom.	Ref. B3170
Programmers	Univac/IBM/COBOL	Commercial	S. Devon	c £5000	Ref. B3189
Programmer	IBM 370/OS COBOL	Commercial	Avon	to £6000	Ref. B3171
Tec. Support/Progs	IBM 370/COBOL	Commercial	Wilts	£5-8000 + reloc	Ref. B3220/18
Programmer	Honeywell/COBOL	Local Gvt.	Glos	c £4200	Ref: N3162
Sen. Programmer	Univac/IBM COBOL Pref.	Engineering	S. Wilts	c £5500	Ref. B3219

OTHER UK VACANCIES

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Computer Operator	370/138 OS/V31	Commercial	Sussex	c £3900	Ref. B3225
Senior Operator	Honeywell 58 GCOS	Commercial	Essex	c £4500	Ref. N3224
Trainee Operator	PDP/11-70 RSX	Commercial	City	c £3000	Ref. N3217
Controller/Conversion	Data 100 Timesharing	Commercial	W. End	to £7000	Ref. L5181
Exp. Operator	ICL 1800 Geo II+	Electrical	W. End	£4700	Ref. L2852
SYSTEMS					
Senior Programmer	370/115 Assembler	Commercial	City	c £7500	Ref. B3140
Programmer 1 yr exp	370/125 RPG II	Commercial	Sussex	c £4500	Ref. B3167
Programmer	2803 COBOL/RPG II	Commercial	N. London	£8000	Ref. L2837
Programmer	2904 COBOL	Commercial	City	£6000+	Ref. L3037

CONTRACT VACANCIES

ICL 2903/4	Operators	North London	Indef.	Ref. CM414
PDP 11/40	Operators	North London	Indef.	Ref. CM408
Honeywell Level 62	Operators	South Coast	2 months	Ref. MH406
ICL 2903/4	Operators	Surrey	3 months	Ref. CM407
IBM DOS VS	Operators	Essex	Indef.	Ref. CM403
PDP 11/45	Operators	West London	2 months	Ref. CM400
IBM DS	Operators	North London	2 months	Ref. CM408A
Honeywell Level 66	Operators	East Anglia	Indef.	Ref. MH311
ICL G/I	Operators	Herts	Indef.	Ref. MH417
ICL 2903/4	Operators	Kent	Indef.	Ref. JW395

If you have 2 years+ operations experience, and are a freelance operator (or intend to go freelance in the near future), contact for full details of our current and forthcoming contracts.

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Experience to date: (Last Position First)
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. . . .
Date . . . . Signature . . . . Reg. No. DATE

LANCHESTER POLYTECHNIC

COMPUTER CENTRE
Due to the expansion of the Computer Centre and in order to prepare for the replacement of the current ICL 1903S computer there are vacancies for

2 TEAM LEADERS
£6,727-£8,060 OR £6,727-£8,342

3 SENIOR PROGRAMMER/ ADVISERS
£6,232-£6,856 OR £6,727-£8,060

AND

2 PROGRAMMER ADVISERS
£4,246-£6,073

Applicants must have a degree or have a graduate equivalent status in mathematics, computer science or other relevant discipline. Have at least two years' post graduate experience (four years' for the Team Leader posts) of programming in a scientific, technological or commercial field, preferably in a variety of computer languages. Applicants for all the above posts should be full members of a relevant professional organisation.
For application form and job specifications please apply in writing enclosing a large stamped addressed envelope to the Personnel Officer, Lanchester Polytechnic, Priory Street, Coventry CV1 5FB returnable by Friday, 8th June, 1979.

British Waterways Board

Computer Centre
Wembley

We are currently involved with 24 Computer Applications, encompassing the many and varied interests of the Board. They range from Water Control to Warehousing, Plant Utilisation to Craft Licensing, as well as the normal Payrolls, Ledgers, etc.
We have outgrown our present configuration, which is now being replaced with the new Burroughs 'B2800' series of Computers. This exciting new development will enable us to develop a terminal network to cover all our administrative centres in England and Scotland. The network will be channelled through a "front-end" processor linked to the main frame, which will also multi-program our existing batch work, in single shift working.

Applications are therefore invited for the following posts

Senior Analyst/ Programmer (Cobol)
Salary range £6,825-£7,305 p.a.)

Analyst/ Programmer (Cobol)
Salary range £5,951-£6,693 p.a.)

These are senior posts within the Board's organisation and applications should state full details of all previous experience in the computer field.

Apply to Principal Personnel Officer, British Waterways Board, Willow Grange, Church Road, Watford, Herts WD1 3QA

UNIVERSITY OF BRADFORD
Computing Laboratory
Computer Officer Posts

Applications are invited from graduates or professionally qualified persons for two posts in the University's Computing Laboratory which operates a large ICL 1904S installation running under the George 3 Operating System and providing a central service for research and teaching within the University.

COMPUTER OFFICERS
(Ref. CL/CO/CW)

Are required in the Systems/Communications and Application groups. Both posts require programming experience and knowledge of the GEORGE 3 Operating System would be an advantage. Salary on scale £4232 to £7145 p.a.

Application forms and further particulars are available from the Personnel Office, University of Bradford, West Yorkshire BD7 1DP.

OPERATIONS MANAGER

FOR RAPIDLY EXPANDING COMPANY
SALARY: UP TO £6,500 + COMPANY CAR

A very busy department currently using an I.B.M. system 32 with two 3742's is looking for an Operations Manager, who can take them into the computer age of the 80's. The person appointed will be directly responsible to the Financial Director. It is essential that the candidate has many years' experience in operations, preferably with I.B.M. system 32, and at the same time is capable of supervising the punching staff and at times to personally operate the I.B.M. 3742's. This is an excellent opportunity for a person with drive and enthusiasm to be involved in most challenging and interesting position. The company is keen to become totally computer orientated with new and progressive systems can you measure up to this interesting opportunity.
Location: South Central London.
Please write or telephone: Mrs. B. M. Farmer, 01-237 6636. Hunter-Penrose Limited, 7 Spa Road, London SE16 3QS.

WILTSHIRE COLLEGES
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E. Sutton,

These positions are open to male or female candidates. Please telephone in confidence for a Personal History Form quoting the appropriate reference to:-

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Further particulars may be obtained from the Secretary of the University Court (Room 18), University of Glasgow, Glasgow G12 8QQ, with whom applications (6 copies), giving the names and addresses of three referees, should be lodged on or before 16th June, 1979.

In reply please quote Ref. No. 4468P.

Puzzle Answer

Trader is now on holiday. This column will be resumed next month.

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